- Sonoco Products' new corrugating mill
- Planning for the sixties
- Theory of adhesion
- Pipe, fittings, valves, and pumps in recovery applications

The Paper Industry

TECHNOLOGY DEPT.

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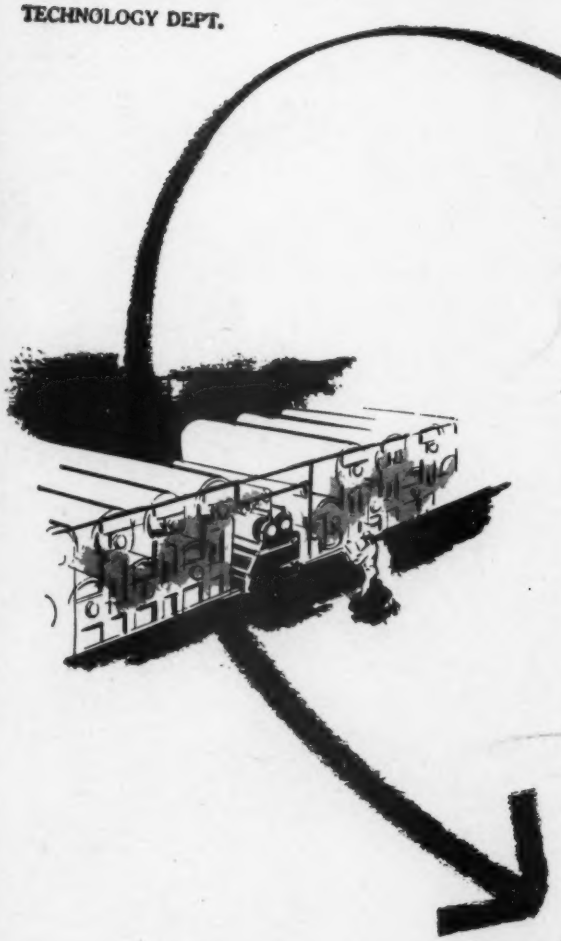

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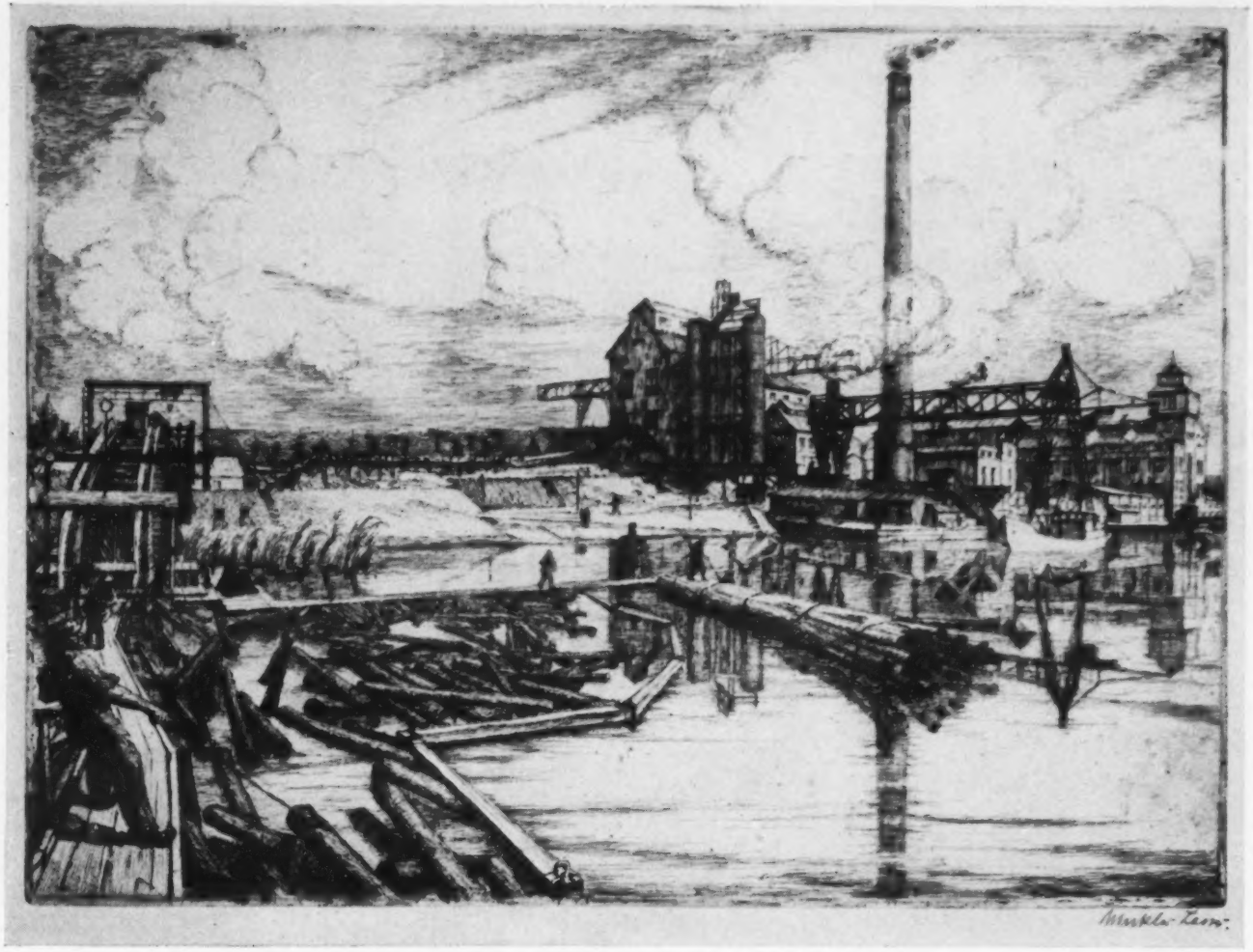

"Log Harbor" Original etching by Paul Winkler-Leers from the Asten-Hill collection.

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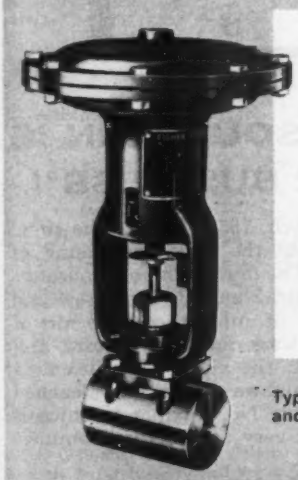
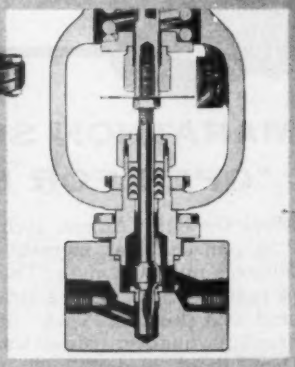
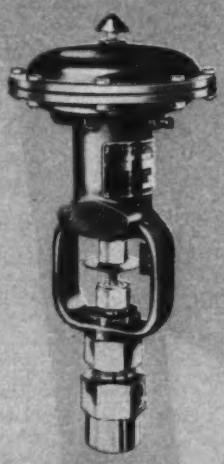
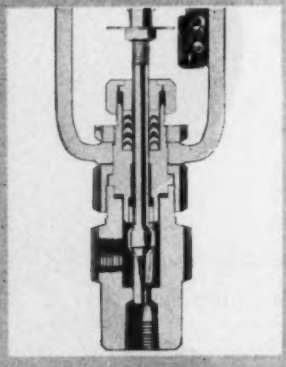




Type 510-B valve with globe body and bolted bonnet construction.





Type 511-BA valve with angle body and a union nut bonnet.

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For complete information write for Bulletin 57 B.

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The Paper Industry

Technology • Engineering • Management • Production

VOLUME 40 **NUMBER 9** **DECEMBER 1958**

Features . . .

Editorial — Paper barometer predicts continued improvement in business activity 577

Whither? — Chemically-modified cotton linters in rag-content paper — Screens used in dewatering NSSC pulp — Westvaco's flakeboard — Roll-coated and trailing-blade-coated paper in one operation — Glassed-steel reactors for chlorine dioxide plants 646

Sonoco Products' new corrugating board facilities 584
by A. W. J. Dyck

Planning for the sixties 590
by Morris C. Dobrow

Adhesives in the paper industry — Part II 593

Standard cost accounting for paper mills — Part II 596
by Edward W. Rogers

The use of pipe, fittings, pumps and valves in the pulp and paper industry — Part VII 598
by Roland L. Allen Jr.

Two-year renovation ends at Hartford City 611

$40,000,000 pulp mill set for Alberta 612

St. Regis to re-open Carthage mill; will expand company-wide 615

Powell River to build western Canada's first fine paper mill .. 616

News . . .

News of the Industry 611
Names in the News 621
Necrology 644

Departments . . .

Current Comments 605
Coming Events 619
Patent Reviews 625
Foreign Abstracts 629
New Products 631
New Literature 639
Market Quotations 643
Index to Advertisers 645

Fritz Publications and its staff extend their readers and advertisers A Merry Christmas and best wishes for a prosperous and Happy New Year

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Some 1900 years ago we had the first Christmas. Again we have a first Christmas, the Pine Bluff Mill of the International Paper Company. We are proud to have had a large part in creating this splendid plant, having furnished all the Stainless Steel Pipe, Fittings, Agitator Tunnels and other units for the Pulp and Paper Mill.

We wish the International Paper Company and its personnel at Pine Bluff, much success in the future and a VERY MERRY CHRISTMAS to all.

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From our point of view..

Paper barometer predicts continued improvement in business activity

THE EXTREMELY close correlation between the output of non-durable goods and paper, which has been described as "the most non-durable among the non-durables", has made the paper industry a sensitive barometer for predicting the state of the nation's general business activity.

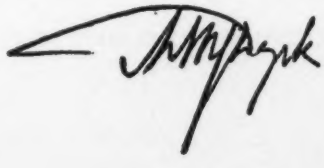
Thus the paper barometer showed a peak of activity during the first half of 1956, while the peak of general business activity was not reached until the middle of 1957. It can therefore be argued that the paper barometer anticipated the recent industrial recession as early as 1956. It also foresaw the end of this recession as early as November, 1957, when the paper industry's declining rate of production began to level off.

Production activity in the paper and paperboard industry in recent weeks has been at 92 and 95 per cent respectively of capacity. In fact the current weekly outputs of 300,000 tons of paperboard have chalked up new production heights for the industry. It is not impossible that, with such resurgence of activity, the total output of the paper industry for 1958 may equal or slightly surpass the industry's output for 1957.

Now that the business recession has apparently run its course, the main question confronting the pulp and paper industry is at what capacity will the mills operate in 1959 and in the succeeding years; and how soon new production capacity will be needed to meet the nation's paper requirements.

The paper industry's stepped-up activity—which is such that we might expect its 1959 production rate to reach the 90-95 per cent level of operating capacity—would indicate that business activity for 1959, in general, will be at a much improved level. At this rate of recovery, any current excess capacity should be completely eliminated in the next few years.

It is still believed that an increase in production capacity by 1965 of 40 per cent over that of 1956 is not only attainable but is in fact a reasonably accurate estimate. Considering that it takes two years to put new facilities into operation, we shall undoubtedly see a greatly-accelerated rate of expansion activity in this industry before very long.



Just what you'd expect from the leader!

Three new modified gum rosin sizes
that already are proving themselves in leading paper mills across the country!

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Trust the leader in the industry to come up with the first and the finest. Cyanamid's vast, diversified and expanding research program is constantly up-grading and improving all Cyanamid products. And our three, fine, new *modified gum* sizes have been developed out of this research. Look them over yourself. They offer new economies in shipping and storage (Cyanamid's 80% solids fortified size is an exclusive in the industry) . . . minimum foam characteristics for top size efficiency (you can make less go farther, or use the same amount for a more highly sized end product) . . . and better color, for highest paper brilliance.

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—Unfortified modified gum rosin size . . . shipped as 80% solids. Has excellent color, low foam. Ideal for use in board . . . and much lower in cost than fortified size. One of the lightest-colored sizes available—and the most efficient!

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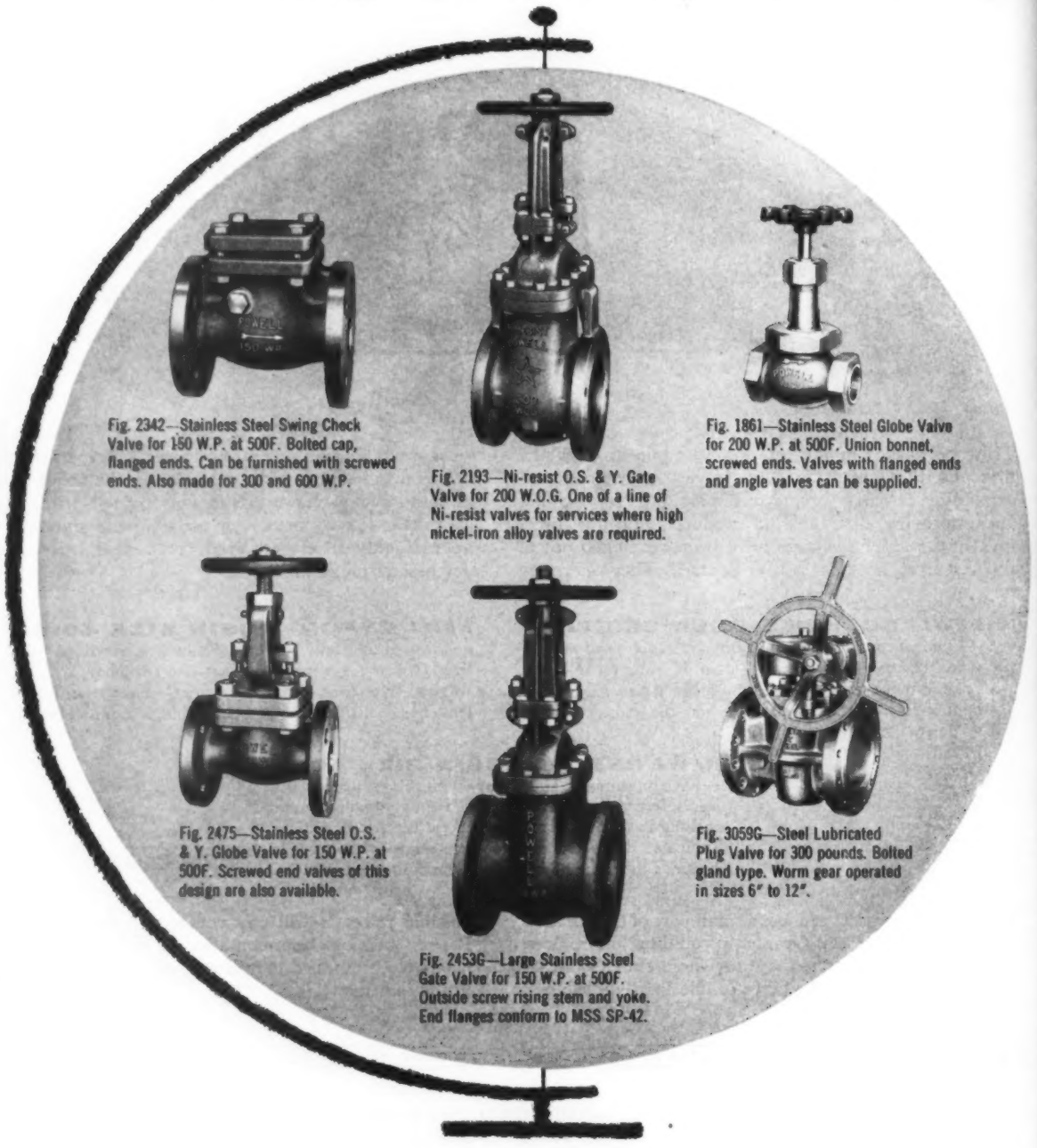

Fig. 2342—Stainless Steel Swing Check Valve for 150 W.P. at 500F. Bolted cap, flanged ends. Can be furnished with screwed ends. Also made for 300 and 600 W.P.

Fig. 2193—Ni-resist O.S. & Y. Gate Valve for 200 W.O.G. One of a line of Ni-resist valves for services where high nickel-iron alloy valves are required.

Fig. 1861—Stainless Steel Globe Valve for 200 W.P. at 500F. Union bonnet, screwed ends. Valves with flanged ends and angle valves can be supplied.

Fig. 2475—Stainless Steel O.S. & Y. Globe Valve for 150 W.P. at 500F. Screwed end valves of this design are also available.

Fig. 2453G—Large Stainless Steel Gate Valve for 150 W.P. at 500F. Outside screw rising stem and yoke. End flanges conform to MSS SP-42.

Fig. 3059G—Steel Lubricated Plug Valve for 300 pounds. Bolted gland type. Worm gear operated in sizes 6″ to 12″.

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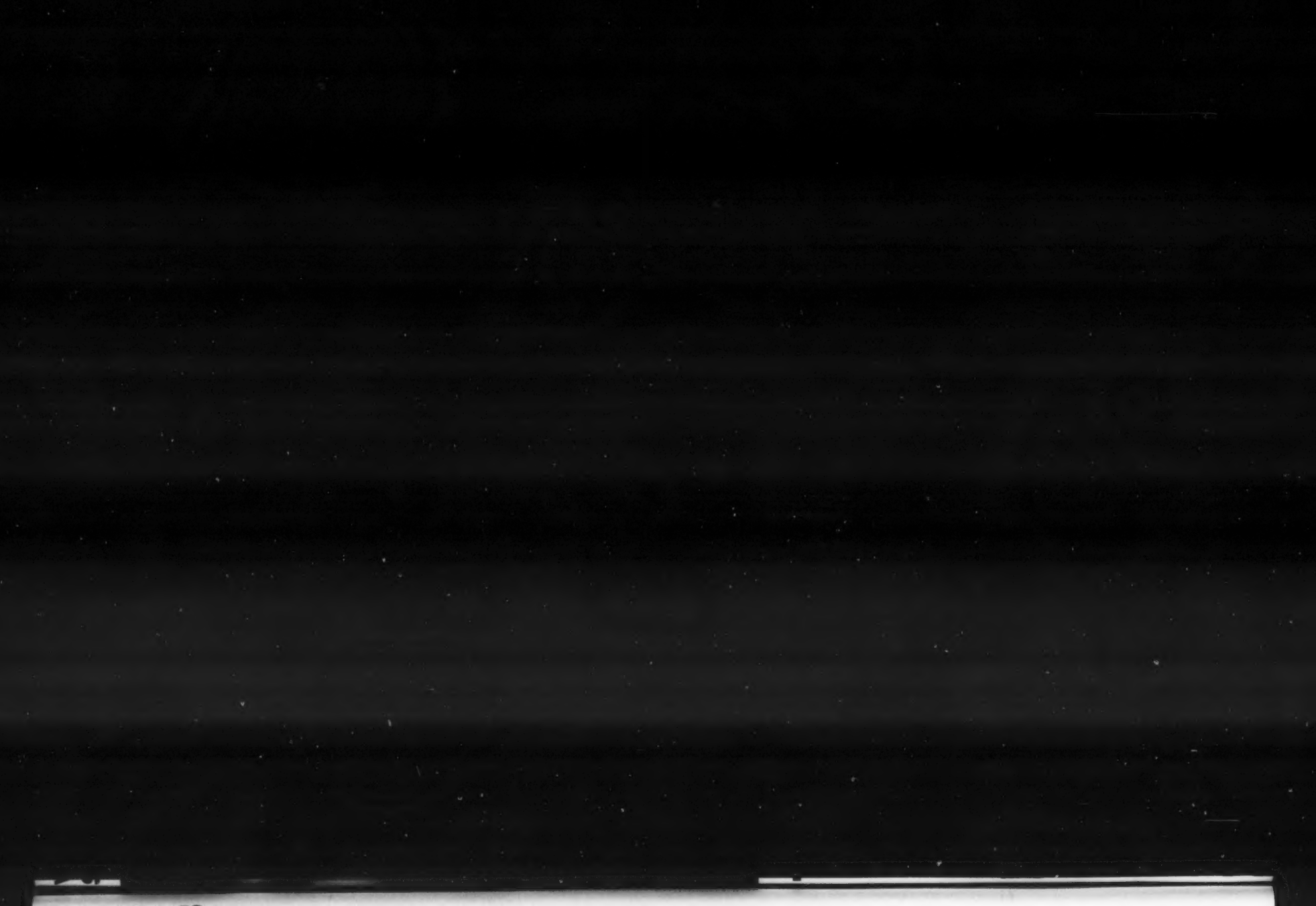

WHERE EVERYTHING
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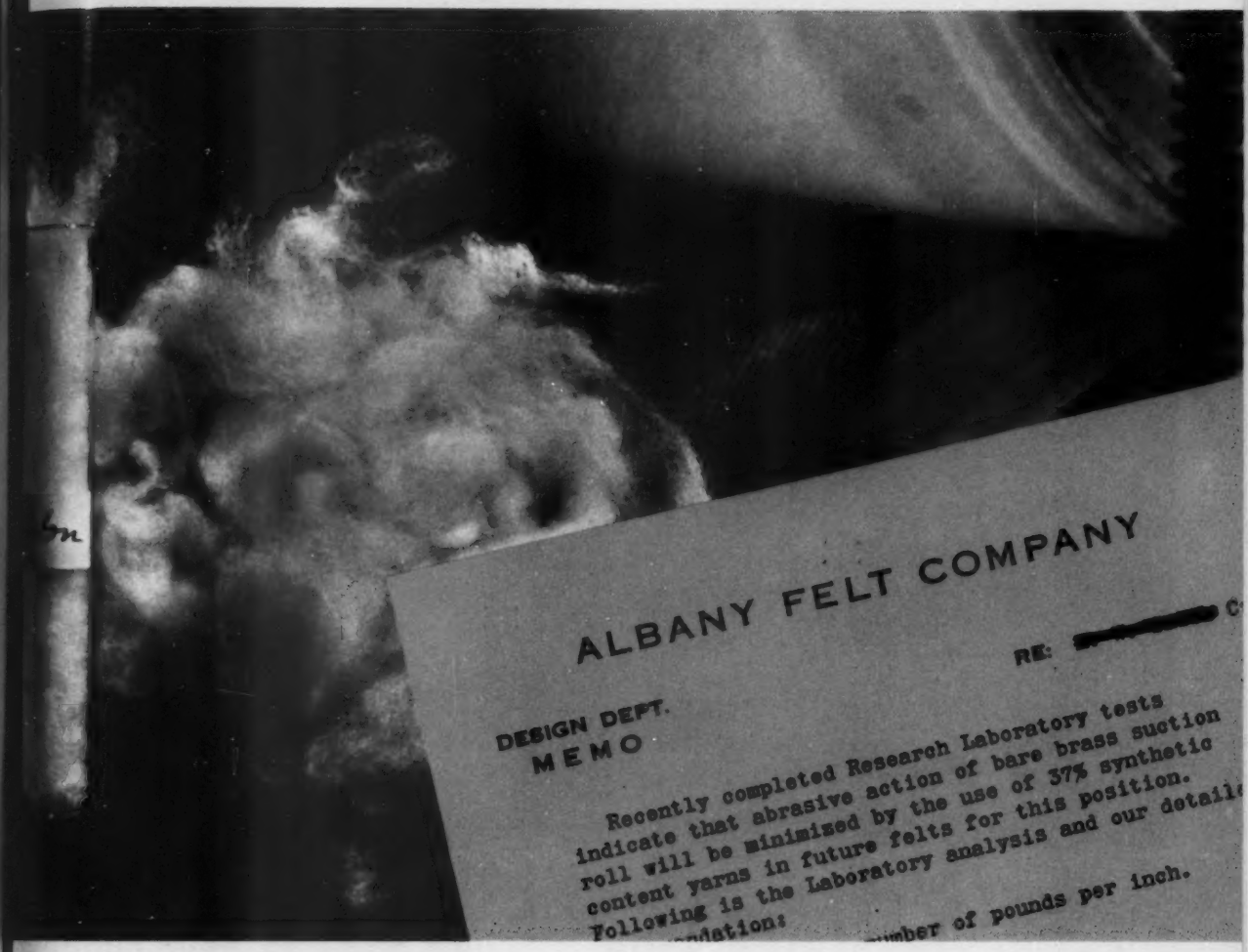
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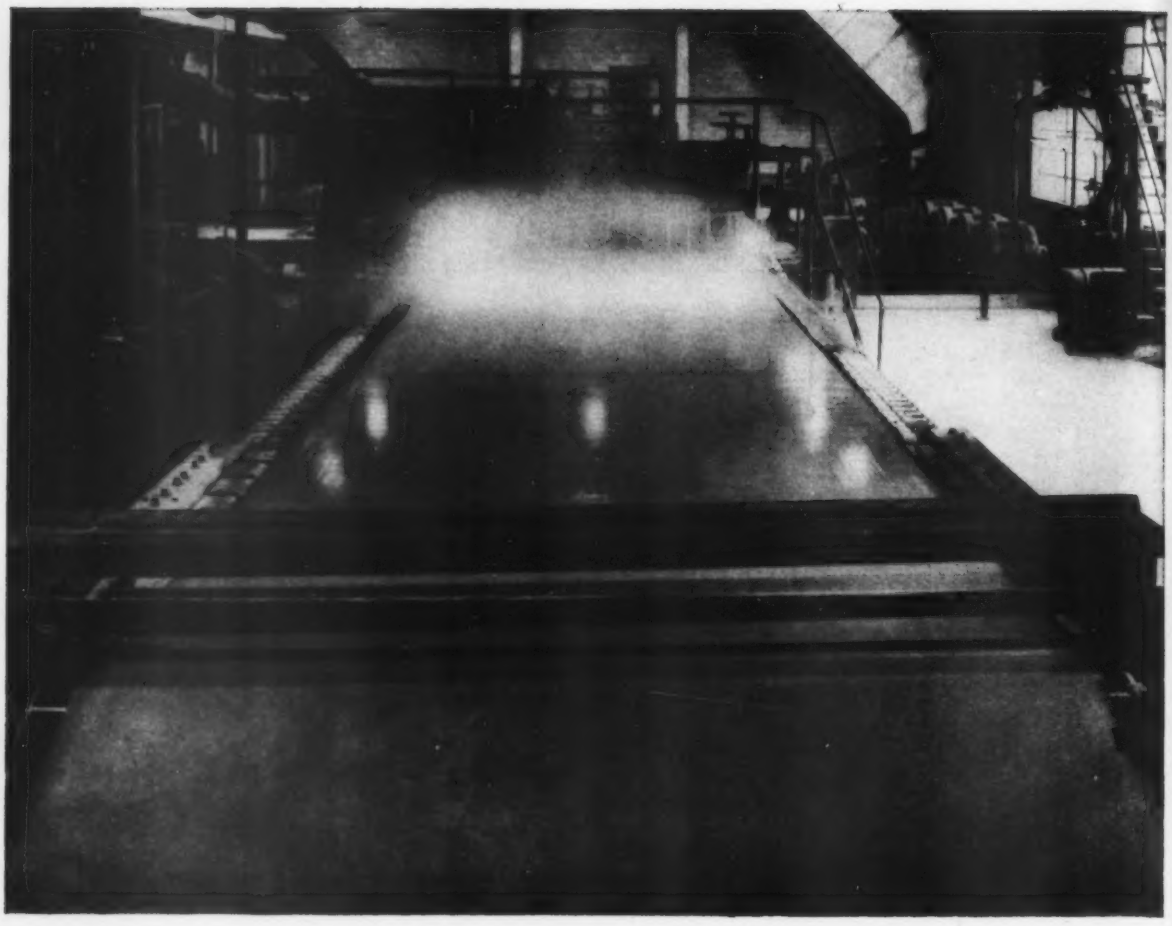

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CORN PRODUCTS SALES COMPANY • 17 Battery Place, New York 4, N. Y.

*A reprint on the results of corn starch usage is available on request from our New York office.

Failing to get the right unwind equipment can be

A COSTLY MISTAKE

Almost any unwind equipment looks good when it is new, but continuous, dependable performance depends on the brake. Continuous braking required on unwind equipment is one of the toughest jobs in roll processing. When your brake, the heart of unwind equipment, hasn't got what it takes it soon loses control of tension on the unwinding web. Parent roll waste increases and quality goes downhill—fast! By the time you locate the fault you're in real trouble!

Continuous unwind braking is like driving a car on long trips day after day, with the brakes on all the time, all the way. Friction and heat transfer present a tremendous challenge to engineering skill. Unwind brakes don't just hold—they must provide highly sensitive continuous web control through a wide torque range, plus extremely smooth, fast stops. The slightest failure in response can snap the web or set up damaging vibrations.

Play it safe! When you choose your unwind equipment insist that it meet these two important requirements: First, it must be designed specifically to meet the unique demands of continuous service; Second, the unwind brake must be custom-fitted to meet your individual needs as they relate to differences in speed, machine width, roll diameter, tension and characteristics of material.

Choice of shaft-type or shaftless design, skew adjustment, edge-guiding, mill roll oscillation and automatic centering are other things to consider when you select unwind equipment.

To give you assurance of dependable service Cameron specialists have developed a full line of unwind equipment including the only complete line of brakes ever built specifically for continuous unwind control (21 models). Is your problem with small diameter rolls of light plastic films such as saran, mylar and cellophane? Or, do you handle 72" diameter rolls of heavy grades of paper or paperboard? No matter what material you work with you can get the *right* equipment custom-fitted with the *right* Cameron brake to meet your exact unwind requirements.

Don't let time and money losses pile up. If you are not getting the *sure* web control you need to stay well ahead of competitive standards then it's high time to contact the Cameron specialists. Do it now . . . write for information on Cameron unwind equipment and web controls.

Ask about the new Cameron Lease Plan

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52 years devoted exclusively to the design and manufacture of slitting, roll winding and unwinding equipment...the CAMERON team of specialists

AA-360

Feature articles

Sonoco Products' new corrugating board facilities

A. W. J. DYCK

The expansion includes a unique Sprout-Waldron continuous digester capable of cooking two different kinds of chips with two different cooking liquors, a chemical plant for recovery of acetic and formic acids and a Black-Clawson 190-in. paper machine fully equipped with differential gear drives and hydraulic speed control.

SONOCO PRODUCTS CO'S. new continuous digester—the first digester installation of this type in the industry—as well as a 190-in. paper machine, a unique chemical recovery system and a new power plant were formally dedicated in June.

The new 175-ton paper machine at the Hartsville, S. C. mill was named "Mr. Mac" in honor of P. L. McCall, Corrugating Div. superintendent. The machine produces .009 corrugating board from semi-chemical hardwood pulp.

The new steam generating unit in the power plant produces 275,000 lb./hr. of steam and is equipped with spreader stokers to feed coal as primary fuel and with a proportioner to feed bark to the pneumatic distributors.

A unique chemical recovery plant produces acetic and formic acid from concentrated black liquor by a process of extraction and distillation developed by Sonoco Products chemists. Acetic acid is extracted with methylethyl ketone and formic acid with ethylene dichloride.

All operations are highly instrumented, featuring a control system and graphic panel for continuous digester operation and a graphic panel for the unique chemical recovery system of two organic acids.

Engineering for the entire project was coordinated by the Sonoco Products Engineering Dept. Roderick O'Donoghue & Co. was consulting engineer on the paper machine and pulp plant project, while Lockwood Green Engineers Inc. were consultants on the power plant and Vulcan Engineering handled engineering on the recovery plant.

Chip preparation and handling

Sonoco Products obtains 30 per cent of its pulpwood requirements in the form of ½-in. chips purchased from the lumber companies. The balance of the chips is obtained from mill chipping facilities.

Logs are debarked in a new 12-ft. × 45-ft. barking drum featuring lifter bars in a spiral arrangement that causes the logs to rise in one part of the drum and slip back in another to increase the rubbing effect of the logs against each other.

The last 5-ft. section of the drum is equipped with bars for loose bark removal before the clean logs discharge to the belt conveyor.

The barking drum drive is a combination of chain and sprocket and speed reducer and pinion-on-ring gear—installed in view of the slow speed of the motor used.

Bark is handled by a 30-in. wide belt conveyor equipped with a scale which records the quantity of conveyed bark. The conveyor operates at 75—150 fpm and handles 1300—2700 cu. ft. of bark per hour.

The barked logs are chipped in a 96-in. disc chipper equipped with ten 27-in. knives. The chipper is belt-driven by a 400-hp wound rotor motor. Chips are stored in a 45,000-cu. ft. silo equipped with chip level indicators that show the chip level on a graphic panel. The silo is further equipped with a rotary plate feeder.

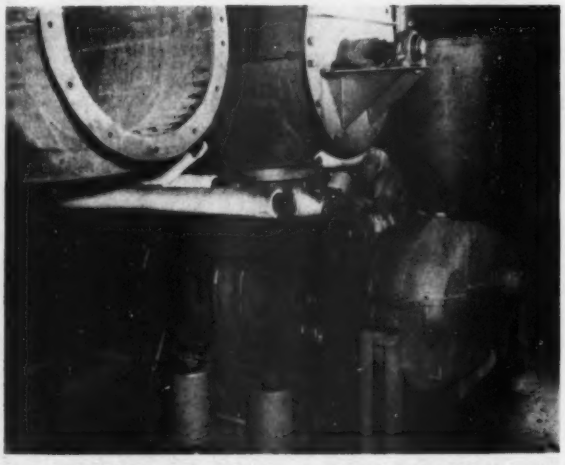
A pneumatic conveying system conveys sawmill chips from the truck unloading bin to the chip silos. The blower unit on the conveying system comprises a Sutorbilt positive displacement 100-hp motor. The air from the blower is piped to a 25 × 35 chip feeder that drops chips into the line at the rate of 45 tons/hr. The chips are conveyed through an 8⅝-in. line over a horizontal distance of 415 ft. and a vertical rise of 95 ft. to the chip silo, where they are discharged through the use of a cyclone.

The 17-ft. dia. rotary plate feeder, controlled by the level in the chip surge bin, feeds through a chip screen to a belt conveyor equipped

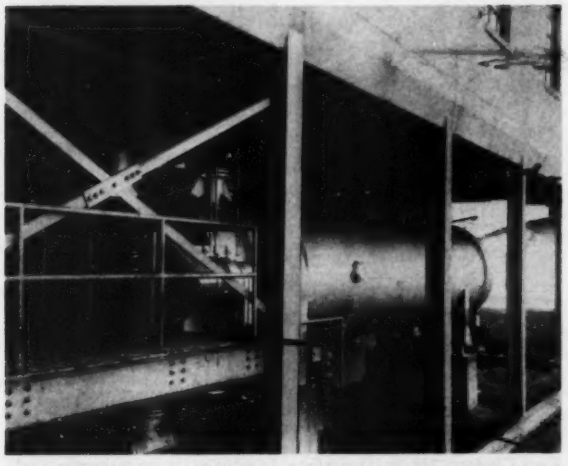
New Carthage Machine barking drum is equipped with lifter bars in a spiral arrangement.

Sawmill chips are pneumatically conveyed from the truck unloading bin by a Rader system.

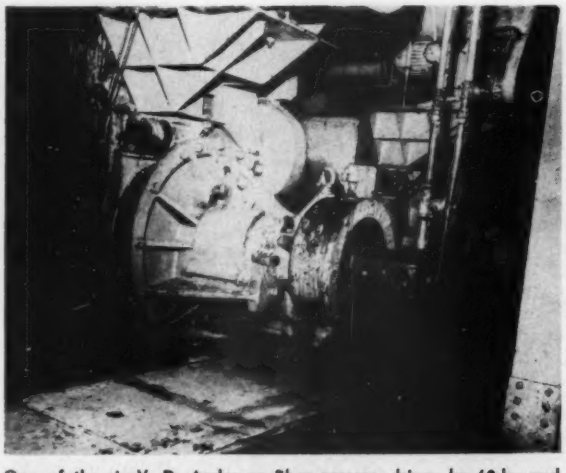
A Link-Belt rotary chip feeder at the bottom of the chip bin feeds a belt conveyor through a chip screen.



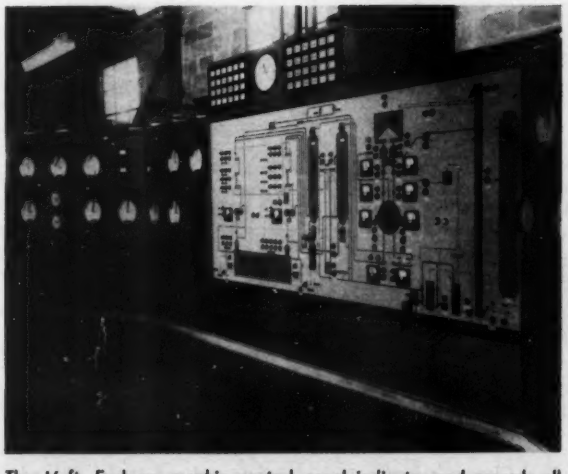
A Sprout-Waldron rotary feed valve introduces chips into the pressure zone.



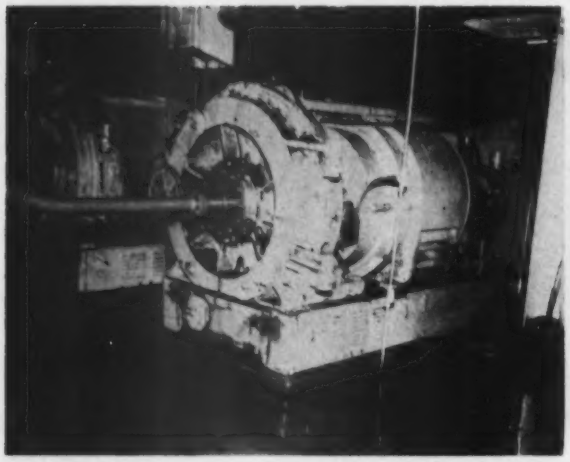
The Sprout-Waldron 8-ft. dia. × 40-ft. long digester equipped with four screw conveyors.



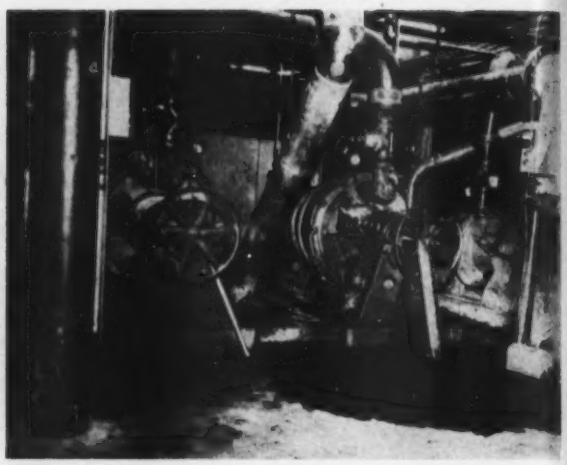
One of the six V. D. Anderson fiber presses, driven by 60-hp and 100-hp Westinghouse motors respectively.



The 16-ft. Foxboro graphic control panel indicates and records all speeds, flows and levels.



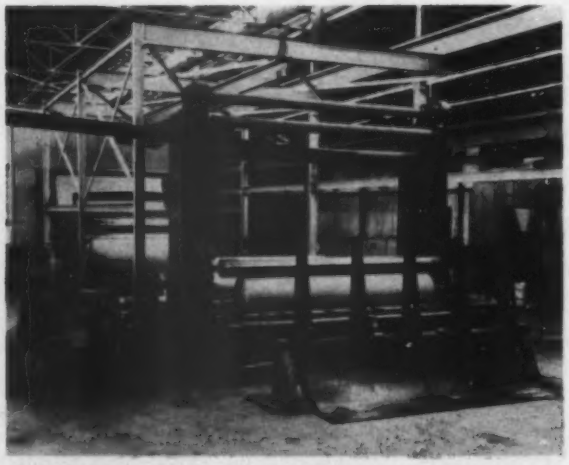
Sprout-Waldron Type 36-2 disc refiners equipped with Uniflow feeders.



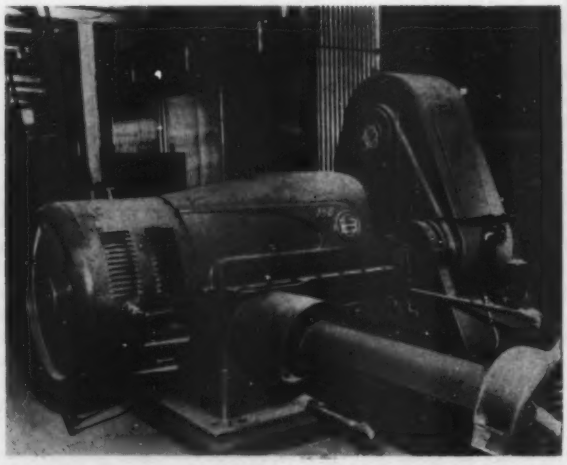
Black-Clawson Miami jordans refine stock ahead of the paper machine.

Black-Clawson 190-in. Hydroflyte fourdrinier is permanently cantilevered for quick wire change.

Black-Clawson dryer section is equipped with Ross-Hooper hood and complete J. O. Ross air system.



Black-Clawson calender stack, Autoflyte reel and Model 40 winder operating at 4500 fpm.



Black-Clawson new differential gear drive on which differential speed is hydraulically controlled.

with a weightometer that senses chip weight pneumatically. A weight receiving recorder mounted in the control room records and integrates this information for use in calculating production, yield, etc. Following the belt conveyor there is an elevator and another belt conveyor to take the chips to the surge bin.

Beginning with the surge bin, the chip flow system branches into a dual system, i.e. through chip breakers (single-disc refiners), pre-steam tubes and rotary feed valves into the two-compartment digester. The rotary feed valves are specially designed to introduce the chips into the pressure zone without appreciable temperature or pressure losses.

Continuous digestion

The continuous digester, consisting of an 8-ft. dia., 40-ft. long cylindrical shell, comprises two independently-operating units, each of the digester halves being divided into an upper and a lower section.

The dual unit digester is equipped with four 30-36 in. dia. screw conveyors arranged in U-shaped troughs, one located above the other. Each pair of screw conveyors located in each of the two units is driven by a variable speed drive. The digester is designed to operate under a pressure of 170 psi.

While pressure conditions are the same in each unit, the digester has the advantage of being able to cook two different grades of chips with two different cooking liquors.

Among other advantages claimed for this unique type of digester are: short cooking time, a low liquor-to-pulp ratio resulting in efficient utilization of chemicals, high yield of uniform quality pulp and flexibility and economy of operation.

The cooking liquor is prepared in the liquor plant, where a soda ash solution is circulated through absorption towers equipped with Raschig rings and sulfited with SO_2 that is produced in two sulfur burners.

The liquor is pumped to a small tank above the digester and then, by means of a high-pressure pump, sprayed onto the chips in the digester through a series of nozzles located above the top screw conveyors. The liquor percolates through the top conveyor chips and perforated conveyor, falls to the chips on the bottom conveyor and is collected in a trough underneath the bottom conveyor. From here it is recirculated to the spray nozzles. Cooking time is approximately 10-15 min. for semichemical pulp and 30-45 min. for kraft or bleach type chemical pulp.

At the exit of each digester line the pulp is discharged by two dischargers into two blow lines and then into a 10-ft. × 40-ft. leach tower equipped with a conically-shaped bottom. Here the pulp is washed in counter-current fashion using the expelled liquor from the screw presses.

From the cone of the leaching tower, pulp is diluted and pumped at a 5-per cent consistency through a consistency regulator (controlled by the agitator drive) to six drainers ahead of the six two-stage fiber presses.

Each fiber press is equipped with a 60-hp motor on the vertical press section and a 100-hp motor on the horizontal section. Each press has a special stainless steel feeder unit driven by a variable speed motor. All parts of the presses coming in contact with the pulp are of stainless steel construction. The presses discharge pulp at about 60-per cent consistency to two screw conveyors that feed eight Type 36-2 disc refiners through uniflow feeders. Pulp is diluted in the uniflow feeders to a consistency of about 8 per cent prior to entering the throat screws of the refiners. Each disc refiner is equipped with a single rotating 36-in. dia. disc and PCR that regulates pulp quality and refiner performance by enabling the operator to set accurate PCR clearance with the aid of a plate position indicator.

The pulp then drops to a chest, where it is further diluted to about 4 per cent consistency and pumped through a consistency regulator to the paper machine room.

Digester control

The entire continuous digester and pulp washing operations are controlled from a conveniently-located 16-ft. graphic panel in the control room. All speeds, flows and levels are recorded and indicated on this panel, which also presents a pictorial diagram of the continuous pulp system controlled through push buttons, bulls eye lights and alarms.

The complete flow rate of chips through the cooking system is set by means of variable speed drag conveyors that are controlled from the graphic panel, while a pneumatic speed recorder logs the speed of the feed conveyors.

Levels of liquor on the storage and dilution tanks are recorded by a dual recorder equipped with Rotax electric control contacts for operation of the dilution valve.

Consistency of black liquor in the pulp leaching towers is based on agitator load, which is sensed by thermal converters and transmitted pneumatically by indicating transmitters to a dual receiving recorder and to two Model 40 controllers. The controllers operate white water control valves to maintain desired consistency.

The paper machine

The 190-in. fourdrinier is designed to produce .009 semichemical boards at speeds of 500-1500 fpm. The headbox is of the open type, designed for capping if future needs should require a pressurized headbox.

The permanently-cantilevered Hydroflyte fourdrinier permits quick wire change without removal of any part from the fourdrinier section. The fourdrinier is further equipped with a 28-in. breast roll, 22 rubber-covered table rolls, guide rolls, wire rolls, five stainless steel suction boxes, a 40-in. dia. suction couch roll and a 30-in. dia. lump breaker roll.

The press section consists of two straight through presses, each with a 34-in. dia. suction roll. The press frame is designed with sufficient spacing to permit the installation of vacuum pick-up when required.

The dryer section—arranged in two sections—consists of 34 paper dryers and eight felt dryers, all of 60-in. dia. and designed for operation at 150-psi pressure. Following the first dryer section, there is a breaker stack with a 30-in. dia. Ferraloy bottom roll and a rubber-covered top roll.

The calender stack, following the second dryer section, consists of two 30-in. dia. Ferraloy rolls.

Following the calender stack is a drum type Autoflyte reel designed to operate pneumatically and at uniform speed. It winds rolls up to 96-in. dia. There is also an unwind stand and a Model 40 winder with roll capacity up to 72-in. dia. at a speed of 4500 fpm.

Paper machine drive

This is the first paper machine fully equipped with differential gear drives on which the differential speed is hydraulically controlled and operated. A hydraulic tachometer motor on each unit acts through a feedback control to synchronize the speed of each section driven by Model 300 and 150 differential gear units. Other differential units are located at the couch roll, first press, second press, breaker stack, calender stack and Autoflyte reel.

The prime mover is a 1500-hp M-25 steam turbine driving the line

Principal equipment installed at Sonoco Products

Consulting Engineers: Roderick O'Donoghue & Co., Lockwood Greene Engineers Inc. and Vulcan Engineering

Chip handling and pulping

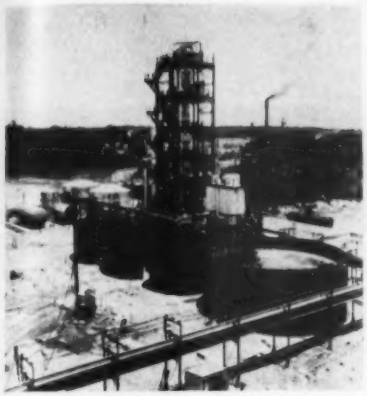
Absorption tower ..... Augusta Iron & Steel Works Inc.
Agitators ..... Black-Clawson Co.
Agitators, stock chest ..... Kraft Equipment Co. Inc.
Barking drum, with lifter bars in a spiral arrangement ..... Carthage Machine Co.
Black liquor evaporator control, on Swenson triple-effect evaporator ..... Bailey Meter Co.
Chain drag conveyors ..... Columbus Conveyor Co.
Chip breakers, on single disc refiners .... Sprout, Waldron & Co. Inc.
Chip drainers ..... Columbus Conveyor Co.
Chip Silo ..... Richmond Engineering Co. Inc.
Chip surge bin ..... Richmond Engineering Co. Inc.
Consistency regulator ..... DeZurik Corp.
Controls and graphic panel ..... Foxboro Co.
Conveyor system, chip elevator to surge bin ..... Kraft Equipment Co. Inc.
Conveyors, silo to elevator ..... Columbus Conveyor Co.
Digester, two-unit, 8-ft. dia. × 40-ft. long, continuous, equipped with double-screw conveyors ..... Sprout, Waldron & Co. Inc.
Digester valves ..... Fabri-Valve Co. of America
Flume conveyor ..... Kraft Equipment Co. Inc.
Fiber presses (6), each unit equipped with a 60-hp motor on the vertical press section and a 100-hp motor on the horizontal press section and a special stainless steel feeder ..... V. D. Anderson Co.
Leach towers (2), 10 ft × 40 ft. .... Richmond Engineering Co. Inc.
Liquor proportioning pumps ..... Milton Roy Co.
Motors and controls ..... Westinghouse Electric Corp.
Pneumatic chip conveying system, with 100-hp blower unit and chip feeder ..... Rader Pneumatics Inc.
Pumps, black liquor ..... Allis-Chalmers Mfg. Co.
Pump, liquor to evaporators ..... Goulds Pumps Inc.
Pumps, for gland seal water ..... Ingersoll-Rand Co.
Pulp dischargers ..... Sprout, Waldron & Co. Inc.
Refiners ..... Sprout, Waldron & Co. Inc.
Rotary feed valves, specially designed .... Sprout, Waldron & Co. Inc.
Rotary table chip feeder, 17-ft. dia. equipped with single plow ..... Link-Belt Co.
Screw conveyors, run-around ..... Kraft Equipment Co. Inc.
Stock valves ..... Fabri-Valve Co. of America
Tanks, white liquor storage ..... Richmond Engineering Co. Inc.
Tanks, white water, pressed liquor and white liquor ..... Truitt Mfg. Co.
Vibrating screen, NRM 135 and collecting tank with 50-mesh stainless steel cloth to handle 150-gpm black liquor ..... Link-Belt Co.

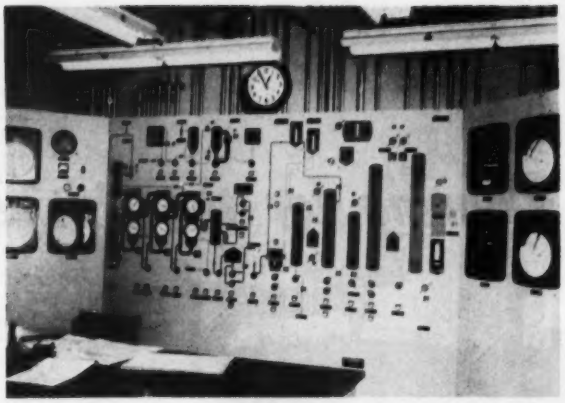
Paper machine

Agitators, stock chest ..... Kraft Equipment Co. Inc.
Air system, consisting of Ross-Hooper hood and exhaust, enclosure supply units, bottom felt system, Ross-Growin system and trim-conveying system ..... J. O. Ross Engineering Div., Midland-Ross Corp.
Breaker stack, 30-in. dia. rubber-covered and Ferraloy rolls ..... Black-Clawson Co.
Consistency regulator ..... DeZurik Corp.
Control instruments ..... Foxboro Co.
Crane, 15-ton traveling electric ..... Maris Crane & Hoist Co.
Dryer drainage system, three-section cascading system ..... Mason-Neilan Div., Worthington Corp.
Dryer section, 34 paper dryers and 8 felt dryers, 60-in. dia. cylinders ..... Black-Clawson Co.
Fork lift trucks (2), one 8000-lb model equipped with improved paper roll clamp .. Yale & Town Mfg. Co.
Grinder-suction box cover ..... Eastwood-Nealley Corp.
Headbox, open design ..... Black-Clawson Co.
Headbox manifold ..... Richmond Engineering Co. Inc.
Jordans ..... Black-Clawson Co.
Lubricating system, automatic ..... Bowser Inc.
Moisture control system ..... Mason-Neilan Div., Worthington Corp.
Motors and controls ..... Westinghouse Electric Corp.
Paper machine, 190-in. Hydroflyte fourdrinier .... Black-Clawson Co.
Paper machine drive, differential gear units ..... Black-Clawson Co.
pH recording controller ..... Foxboro Co.
Piping, installation ..... Industrial Piping Inc.
Pipe insulation ..... Eastern Insulation Co.
Platform scale ..... Howe Scale Co.
Pumps, centrifugal .... Aurora Pump Div., New York Air Brake Co.
Pumps, fresh water ..... Fairbanks, Morse & Co.
Pumps, stock ..... Goulds Pumps Inc.
Press section, 2 straight-through presses, with 34-in. dia. suction rolls ..... Black-Clawson Co.
Reel, Autoflyte, pneumatic-operated ..... Black-Clawson Co.
Reel hoist, 10-ton capacity ..... Northern Engineering Works
Rubber roll covering on 22 table rolls, 7 wire guide rolls, 7 felt rolls, 2 worm felt rolls, one lump breaker roll, 3 top press rolls, 1 suction press roll ..... Reybestos-Manhattan Inc.
Seal pit liquid level control ..... Foxboro Co.
Starters (7), Ampgard, 2 on refiner motors, 3 on jordan motors and 2 on vacuum pump motors ..... Westinghouse Electric Corp.
Steam turbine on paper machine drive, 1500-hp, with vertical oil relay governor ..... Westinghouse Electric Corp.
Vacuum pumps ..... Nash Engineering Co.
Valves, on jordans and fan pump ..... Fisher Governor Co.
Winder, Model 40 ..... Black-Clawson Co.

Power plant

Ash-handling system, consisting of an ash pit hopper, a Jetpulsion sluice and Hydroveyor pneumatic conveyor ..... United Conveyor Corp.
Bark conveying and weighing equipment ..... Link-Belt Co.
Bark proportioner, rotary type ..... Riley Stoker Corp.
Boiler, 275,000 lb. steam/hr. capacity ..... Riley Stoker Corp.
Boiler feed pumps (2), each rated at 322,000 lb/hr. ..... Byron Jackson Pumps Inc.
Boiler instruments and controls, including combustion control, feed water control, steam temperature control and steam coil air heater control ..... Bailey Meter Co.
Blowdown tank ..... Gary Steel Products Corp.
Bucket elevator ..... Webster Mfg. Inc.
Cinder reinjection system ..... Riley Stoker Corp.
Coal bunker ..... Truitt Mfg. Co.
Coal feeders (6), Model "D" ..... Riley Stoker Corp.
Coal-handling system, consisting of hoppers, feeders, belt and flight conveyors ..... Fairfield Engineering Co.
Continuous blowdown system, No. 4410 ..... Cochrane Corp.
Continuous tube economizer ..... Riley Stoker Corp.
Crane, 50-ton overhead ..... Maris Crane & Hoist Co.
Deaerating heater, 275,000 lb./hr. ..... Chicago Heater Co.
Demineralizing equipment .. Permutit Co. Div., Pfaudler Permutit Inc.
Dust collector, 5 RWS multi-tube design, 95.8% efficiency ..... Aerotec Corp.
Electric power distribution system ..... General Electric Co.
Fans (2), one forced-draft 99,500-cfm and one induced-draft 165,000-cfm, driven by 600-hp and 900-hp motors respectively ..... Westinghouse Electric Corp.
Feedwater heaters ..... Foster Wheeler Corp.
Liquid level controller on demineralizer water tank ..... Fisher Governor Co.
Motors and controls ..... Westinghouse Electric Corp.
Piping insulation ..... Eastern Insulation Co.
Pumps, one 2000-gpm fresh water driven by a 60-hp motor; one 700-gpm driven by a 60-hp motor and pumping water from the surge tank to the deaerating tank; one 6200-gpm driven by a 75-hp motor supplying cooling water to condenser; and two service water pumps of 3000-gpm and 640-gpm capacities ..... Fairbanks Morse & Co.
Pumps, condensate ..... Deen Bros. Pumps Inc.
Pumps, chemical feed ..... Milton Roy Co.
Pumps, demineralizer transfer ..... Ingersoll-Rand Co.
Pumps, water to ash-handling system ..... Layne & Bowler Inc.
Pneumatic distributors for unhogged bark distribution ..... Riley Stoker Corp.
Screen, traveling intake ..... Link-Belt Co.
Screw conveyor ..... Link-Belt Co.
Smoke stack, 92 ft. high, made of steel plates ..... Southern Engineering Co.
Steam lead ..... Grinnell Co. Inc.
Steam turbine generator, 12,500-kw, automatic double extraction type ..... General Electric Co.
Steam turbine, 900-hp E-125 unit on boiler feed pump ..... Westinghouse Electric Corp.
Surge tank, for feedwater system ..... Gary Steel Products Corp.
Surface condenser, 9500-sq. ft. two-pass designed to condense 85,000 lb. steam/hr and equipped with "Tubejet" air ejector ..... C. H. Wheeler Mfg. Co.
Structural steel ..... Southern Engineering Co.
Switchgear equipment ..... General Electric Co.
Traveling grate spreader stoker, 22 ft. × 21 ft., arranged for rear ash discharge ..... Riley Stoker Corp.
Valves, control, diaphragm-operated ..... Fisher Governor Co.





The unique chemical system for the recovery of acetic and formic acids, and the graphic panel controlling this system.

shaft through a reduction gear with a double-ended gear shaft arrangement. The turbine is equipped with a vertical oil relay governor, which features (1) a completely-enclosed hydraulic system using one source of oil for governing and for turbine lubrication, (2) separate motor-driven oil pumps supplying oil at constant pressure, (3) frictionless speed sensing element and (4) unit responsibility for turbine and the governor. The speed reduction gear is of the double helical design, which insures automatic centering of gear and pinion at all loads.

Dryer drainage system

The dryer drainage system is of a three-section cascading design with independent control on the first wet end group of dryers. Blow-through steam from the wet end is used in the bottom felt heaters. Condensate from the machine is piped to a flash tank and the resulting low-pressure steam used in the hood heaters. The system was designed for maximum machine flexibility and minimum steam consumption.

Air systems

The air systems in the new mill consists of Ross-Hooper hood and exhaust enclosure supply units, bottom felt system, Ross-Grewin system (consisting of a Sturtevant compressor and heater coils) and a trim conveying system (consisting of Sturtevant Design 9 centrifugal compressor trim injectors and duct work).

The machine hood has 3-in. insulated top panels. Side panels are made of two sheets of corrugated aluminum with hardboard stiffening between them. The front curtains lift automatically when the sheet breaks, while the real curtains slide horizontally when required. The two enclosed air supply fans are of the 72-in. axial flow type, each driven by a 20-hp motor.

The two enclosure supply units are equipped with supply fans of the axial flow type as well as with banks of heater coils to provide heated air to the hood and machine through a network of distributing ducts.

Upon a sheet break—when the front curtains go up—the enclosure supply units automatically shut off the heated air and supply outside air to the front side of the dryer section for comfort of the operators.

The two bottom felt systems utilize Sturtevant centrifugal fans, providing heated air across the full width and length of the bottom dryer felts through high-velocity vapor absorption type nozzles.

Power plant

The new power plant includes a steam boiler and a 12,500-kw turbine-generator. The Type RX steam generating unit, which burns coal and bark and generates 275,000 lb. of steam per hour at 1250 psi pressure and 950° F at the superheater outlet, is designed for future firing with natural gas and oil through intertube burners installed in the furnace sidewalls.

The coal-handling system supplying the power plant is designed to handle 100 tons per hour of stoker size coal from the railroad receiving hopper directly to the coal storage bunker or via the ground storage area to the coal storage bunker.

This coal handling equipment consists of a 12- × 24-ft. track hopper, a 30-in. wide by 27-ft. long inclined apron feeder to feed coal from the hopper to an inclined belt conveyor, an 8- × 8-ft. reclaim hopper, a 36-in. wide by 24-ft. long reciprocating feeder to feed coal from the reclaim hopper to the inclined belt conveyor, a 24-in. wide by 284-ft. long inclined belt conveyor conveying coal from the hoppers to the coal storage bunker ro ground storage area and a 16-in. wide by 36-ft. long totally-enclosed flight conveyor to distribute coal from the belt conveyor to the coal storage bunker.

The steam boiler is equipped with forced and induced draft fans. The 99,500-cfm forced draft fan is a Sturtevant No. 105 Turbovane Design DWDI equipped with backwardly pitched blades, inlet vane control and dual shaft extension.

The 165,000-cfm induced draft fan is a Sturtevant Series 2000 fan 2/3 DWDI equipped with forwardly curved blades, ½-in. thick sectional renewable scroll liners, inlet and outlet dampers, self-aligning water-cooled bearings, wheel blade liners and dual extension shaft.

The boiler is also fully equipped with combustion control, three-element feed water control, two-element steam temperature control and steam coil air heater control.

Coal feed rates are accurately controlled and metered by six Model "D" feeders, while four pneumatic distributors located above the feeders uniformly distribute unhogged bark removed from a rotary type proportioner.

A 22-ft. wide by 21-ft. long traveling grate spreader stoker—arranged for rear ash discharge—is powered by twin hydraulic drive units and provided with air zones to regulate air distribution and maintain a well-distributed pattern of ignition.

Ashes from the furnace bottom are stored in a refractory-lined ash pit hopper and periodically removed by gravity to a Jetpulsion sluice system. The ash pit hopper is equipped with a vertically lifting door for controlling feed of the ashes to the ash sluice. The ashes are removed at the rate of more than 25 tons/hr. and carried over a distance of 400 ft., with a water consumption of 675 gpm at 90-psi pressure.

(Continued on page 599)

Planning for the sixties*

MORRIS C. DOBROW**

Total marketing—the key to full utilization of capacity—is both the challenge and the opportunity before us.

THE RECENT RECESSION was not only the sharpest and most severe of the postwar recessions, but it was also the shortest. Much of the explanation of its brief duration can be found in two sources.

1. **The continued high income of the consumers and their willingness to continue spending, at a high level, for goods and services,—particularly soft goods.**
2. **A sharply-increased activity on the part of the government, which within the first nine months of 1958 turned from a net saver of $3 billion a year to a net spender with a deficit of $12 billion a year.**

Over-all paper production

Over-all paper and paperboard production in the first nine months of this year was 2 per cent less than in the first three quarters of 1957. Output in the second half of 1958 is likely to exeed the output of the second half of 1957.

It is expected that for the year as a whole the industry will produce approximately 30,400,000 tons of paper and board—about 1 per cent less than in 1957. Because of increased capacity, operating ratios show a larger decline. In 1956 the industry operated at 97 per cent of six-day capacity; in 1957 at 89 per cent, and in 1958 it is expected to average 84 per cent.

In 1959 and 1960 a full recovery from the recession should put the industry back on the track of normal growth. It is probable that 1959 production will exceed that of 1956—the previous record year.

Fine paper

Of the approximately 30,000,000 tons of paper and board produced this year by the over-all industry, about 15,500,000 tons is board and 14,500,000 tons paper.

Of the 14,500,000 tons of paper, about 1,500,000 tons fall in the fine paper segment. The fine paper category, in the manufacturers' classification, consists of the following:

Rag content	120,000 tons
All-wood papers	1,050,000 tons
Bristols	115,000 tons
Cover and text papers	100,000 tons
Thin papers (carbonizing, condenser, cigarette paper, etc.)	115,000 tons
Total	1,500,000 tons

So far this year the fine paper business is about 3 per cent behind the same period last year. It is expected that sales in the fourth quarter of 1958 will match or better the monthly shipments of the fourth quarter of 1957, and we shall probably wind up the year with a loss of less than 2 per cent.

The paper merchants' fine paper dollar sales for the first eight months of the year were 2 per cent less than last year. With the indicated trend, the total for this year as a whole should not be much different from what it was last year.

Merchant distribution and total marketing

About 75 per cent of the fine paper production goes through paper merchants and the balance largely through converters for refabrication into consumer items. A rather small part of our production is being sold through direct channels because of competitive market conditions.

This pattern of distribution in the fine paper industry has been developed and maintained for many years because paper merchants have been able to distribute the product to the user in the most efficient and most economical manner.

Per capita consumption of paper has grown from 282 lb. in 1945 to something like 412 lb. last year. While the increases have been largely in packaging paper and board, which have revolutionized that art, there have also been substantial increases in the sanitary papers—facial tissues, napkins, etc. Other major grades have grown at something like 3-4 per cent per year.

The increase in population was responsible for about half of the increase in consumption, while the other half came from increased per capita use, a good part of which may be attributed to research and development that have opened up new markets for both the established grades and new products.

There is no reason why these trends should not continue in the next decade. In the middle of 1958 the population of the United States was 174,300,000, and in eight years it should be something like 200,000,000.

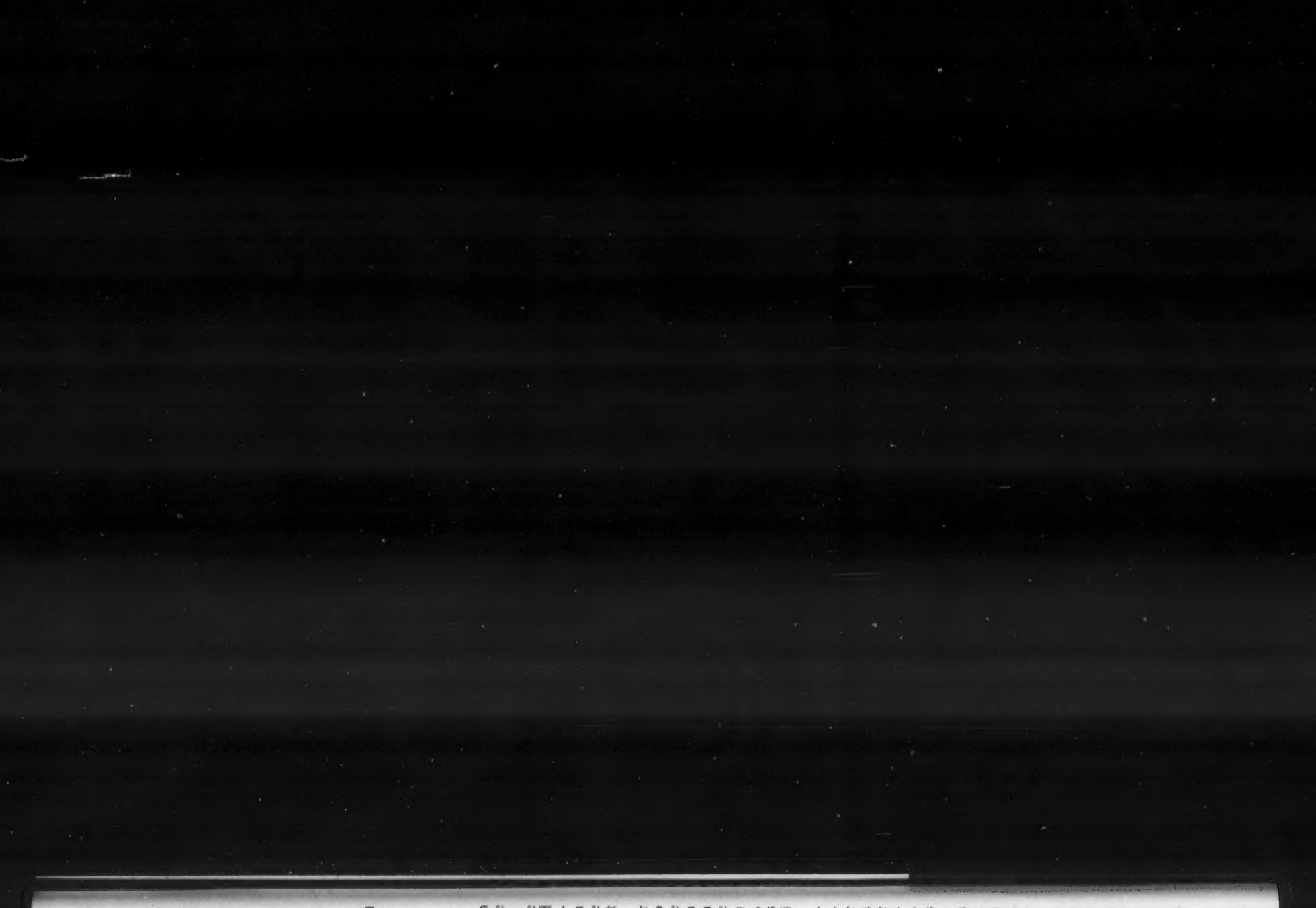
Increases in per capita consumption also are expected to go forward. They will come from two sourcess, i.e., new uses and increased standards of living.

While the paper industry may have been in the process of expanding its facilities too much for the markets of 1957 and 1958, it is reasonable to

(Continued on page 644)

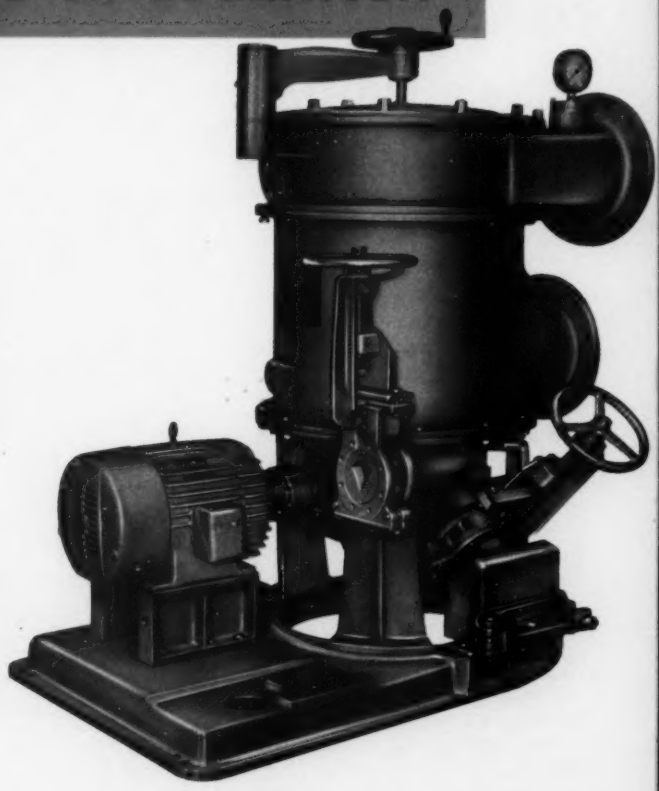
*Abridged from a paper presented at the annual sales conference of Nekoosa-Edwards Paper Co.

**Executive secretary, Writing Paper Manufacturers' Association.



OVER 1300 BLACK-CLAWSON SELECTIFIER SCREENS IN OPERATION

Proof of Outstanding Performance on Any Grade



You buy experience when you install a Selectifier® Screen. You get the benefit of the experience Black-Clawson has gained during 18 years of research and development in pressurized screening. You get the assurance that comes with the screen that has established a record of successful performance on nearly every grade of paper and board in mills all over the world.

You get these operating advantages:

Ahead of the Paper Machine:

- Increased machine production . . . fewer breaks because stock lumps and slime slugs are removed.
- Clean stock . . . pins, shives and unwanted material removed.
- Improved formation . . . deflocculates fibre bundles and disperses the stock.
- Longer wire and felt life . . . clothing and precision equipment protected from damage caused by foreign objects.

In the Pulp Mill:

- Efficient performance on high consistency stocks.
- Removes shives, knots and uncooked chips.
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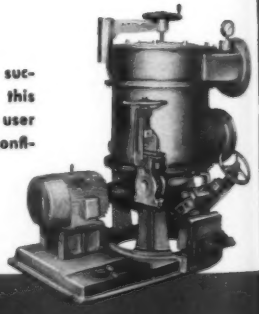

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Adhesives in the paper industry

Part II — The theory of adhesion

For adhesive bonding, molecular attraction and a liquid state are necessary to bring into play the various molecular forces that contribute to adhesion.

IN ORDER TO DISCUSS adhesives intelligently we must be familiar with some of the terminology that the adhesives chemist employs. A glossary that will be of value for ready reference is contained in Table I (Part I, November).

Adhesive bonds

The theory of adhesion has been discussed by a number of workers, including Staverman in De Bruyne and Houwink (4) and Reinhart (6).

The development of the theory of adhesion started when our prehistoric ancestors gained sufficient intelligence to wonder why mud or clay demonstrated adhesive characteristics, whereas water did not. Although we have made great strides in finding the answers, the final theory of adhesion has yet to be written. A qualitative explanation of adhesion can be derived from the vast amount of information that exists about molecular attraction. Certainly this explains why most materials that are adhesive behave as such. But what molecular attraction still does not explain is why two materials will not stick together when molecular structure, reasoning by analogy, indicates that they should.

Staverman (4) considers that bonding is simply molecular attraction. When this attraction is at a maximum, bonding strength is the greatest. Staverman provides the theoretical justification for three types of molecular forces. These are London forces, Debye forces and Keesom forces. Specific types of bonding encompassed by these general classes include:

1. **Electrostatic** bonding, in which bodies are attracted by virtue of their opposite charges. This is obviously a simple case of molecular attraction and is familiar to any student of elementary physics or chemistry.
2. **Covalent bonds,** which are formed between two atoms by the sharing of electrons. This is the type of chemical bonding that explains the molecular attraction between hydrogen and chlorine to form hydrogen chloride or between carbon atoms to form the basis for the myriad of organic compounds known today.
3. **Coordinate covalent bonds,** which are a subclass of 2 and a special case of electron sharing.
4. **Metallic bonds** of the type that hold atoms of metal together.
5. **Secondary bonds** of which Van der Waals forces are the most important. These secondary bonds of the Van der Waals type depend on three phenomenon.
   a. The orientation effect of a permanent dipole such as exists in many organic compounds like nitrobenzene.
   b. An induced orientation that results when a non-polar substance is subjected to the action of an electric field. In the latter instance, the orientation disappears when the field is removed.
   c. The dispersion forces that depend on the interaction between electrons due to shifting. These forces are never as strong as the induced dipole forces.

To discuss these forces in greater detail, it may be pointed out that electrostatic or heteropolar bonds are typified by common salts such as sodium chloride. Compounds with bonds of this sort ionize in solution. Such bonds are very seldom operative in adhesive bond formation. Possible exceptions may result in polymers that contain carboxyl groups along the chain. Such polymers result, for example, from the polymerization of styrene or vinyl chloride with maleic anhydride or fumaric acid. The free carboxyl groups that result may then form salts with metal surfaces. On the other hand, the carboxyl groups also increase the polarity of the molecule bringing into play secondary bonding forces. Very careful analytical work is, of course, necessary in order to determine which of these two types of bonding is operative or whether both are coexistent.

The covalent type of bonding in adhesives is demonstrated when inorganic materials adhere to organic-like products. For example, the adhesive bond between glass and a chlorosilane is probably of the covalent bond type.

Hydrogen bonding is an example of a coordinate covalent bond. This type of bonding probably accounts for the adhesion that exists between many organic materials and their adherents, especially where the organic substances contain carbonyl and hydroxyl groups. Cellulosic type adhesives, like starches and gums, probably bond by coordinate covalent linkages.

Metallic bonds are demonstrated by the adhesion that exists between two layers of metals. Here, free electrons move between the atoms in a continuous set of energy levels within the metal. This free transfer of electrons sets up forces on the surface of the metal that are equal and opposite in charge to the force field of a material close to the metal surface. The attraction, then, is due to the difference in charge; and the important prerequisite is that the two surfaces be in sufficient proximity for these forces to be effective.

As indicated above, the secondary or so-called Van der Waals forces are weaker than the primary valence bonds and arise from residual energies existing in the molecule. These forces appear to exhibit their greatest effect with compounds rather than with atoms and molecules of elements. Van der Waals forces are generally asso-

ciated with asymmetry of a molecule; and the most important adhesive bonding forces, particularly with organic compounds, are generally attributed to Van der Waals forces.

All of these molecular forces, to a greater or lesser effect, then, contribute to adhesion. Presumably, electrostatic forces are the least important. In the normal process of bonding, accordingly, it is necessary to bring these forces into play by affecting molecular proximity. It is of great importance to realize that molecular proximity, which becomes synonymous with adhesion, can be achieved only by creation of a liquid state (liquefaction) between the two surfaces. This state of liquefaction may be obtained by:

1. The use of an adhesive.
2. The use of a solvent to dissolve a portion of the surfaces to be bonded.
3. The use of heat to melt the surfaces to be bonded.
4. The use of pressure to liquefy the surface.
5. A combination of these operations, as is usually the case.

Factors contributing to bond strength

Thus far, then, it has been pointed out that for adhesive bonding molecular attraction and a liquid state are necessary in order to bring the molecular forces into play. Beyond these two factors there are others that contribute to the formation of the bond and particularly to its strength. The maximum bond strength, or maximum force obtainable by molecular attraction, is seldom if ever achieved. There are many factors that detract from maximum molecular attraction such as dirty, erose or improperly machined surfaces. The degree of crystallinity also is important, for it has been shown that the adsorptive energy of crystalline surfaces is not uniform but varies with the "topography" of the adsorbing surfaces. Still other factors are the inability of the surface to be wet once liquefaction has been achieved. Furthermore, the surface tension and the interfacial tension of the liquid layer are important considerations in attempting to achieve maximum bond strength. Of great importance is the thickness of the liquid layer, for it has been shown repeatedly that adhesion decreases with increasing thickness of this layer.

Internal stress, set up for a variety of reasons once the bond has been formed, detracts markedly from bond strength. Such stress is set up if the adhesive shrinks on returning from the liquid to the solid state. Thus, it becomes necessary to study the rheological properties of any proposed adhesive. Lack of elasticity in either the adhesive or the bonded substrates sets up strains, and thus it is desirable for a good adhesive to have a low elastic modulus. Certainly the modulus of the adhesive should be lower than that of the surfaces that are being bonded. The effect of solvents and plasticizers are important in preventing strains.

It is important also to consider by what means liquefaction should be achieved as relates to bond strength. In some instances, the use of solvents is preferable, whereas in other situations less strain results if heat is used as the means of liquefaction. Thus, bonds sometimes fail because of the evaporation of 2-5 per cent of the solvent, or because of the loss of a similar percentage of plasticizer over a period of months or even years. This loss converts the adhesive to a glassy, non-adhering layer.

Strain also is set up if the bond once formed is subjected to extreme temperatures or to changes in temperatures. Chemical changes that may go on in an adhesive, such as continued cross-linking or continued polymerization, will lead to embrittlement and consequent loss of adhesion. All of these factors, then, that are mechanical, chemical and physical detract from the maximum amount of adhesion obtainable by molecular interaction.

In algebraic terms, accordingly, the adhesive strength is the force of molecular interaction, less the detractive forces of surface effects, internal stress and mechanical defects, all of which have been discussed. Adhesive strength is measured by noting the quantity of external stress that must be applied in order to break the bond. This process is also fraught with difficulty, for there are many mechanical problems that stand in the way of the proper design of an apparatus for the application of external stress.

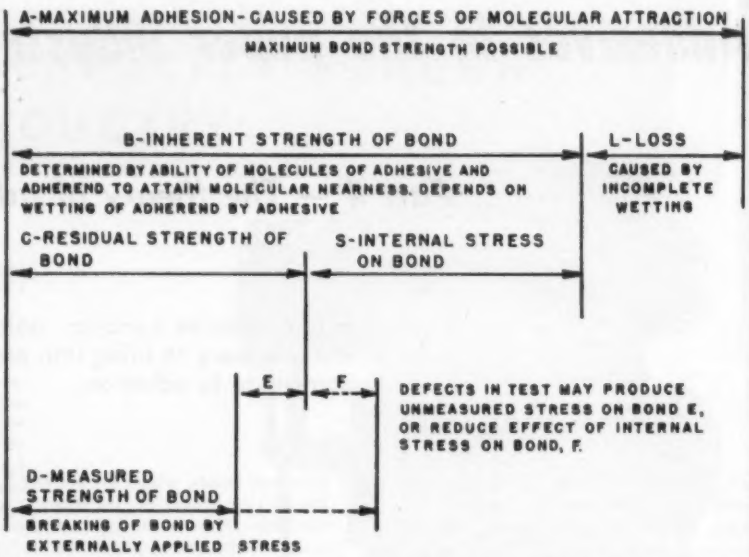
Classes of adhesives

In an excellent article on adhesion, Reinhart (6) describes some of the variations that exist between several of the modern theories of adhesion. He points out that it would be advantageous to combine all of these theories into an organized scheme to explain the source of adhesive forces and what effect other characteristics of the system have on the actual bond strength obtained. He has ingeneously reduced his theory of adhesion to the graphic form in Table II.

A study of the chart in Table II indicates that the cause of adhesion "A", as the above discussion also assumes, is the molecular forces between the adhesive and its substrate or adherent, Reinhart makes the important point, then, that adhesion is chemical and not mechanical in nature, pointing out that mechanical adhesion

TABLE II

REINHART'S[6] THEORY OF ADHESION*


A-MAXIMUM ADHESION-CAUSED BY FORCES OF MOLECULAR ATTRACTION
MAXIMUM BOND STRENGTH POSSIBLE
B-INHERENT STRENGTH OF BOND
DETERMINED BY ABILITY OF MOLECULES OF ADHESIVE AND ADHEREND TO ATTAIN MOLECULAR NEARNESS. DEPENDS ON WETTING OF ADHEREND BY ADHESIVE
L-LOSS
CAUSED BY INCOMPLETE WETTING
C-RESIDUAL STRENGTH OF BOND
S-INTERNAL STRESS ON BOND
E
F
DEFECTS IN TEST MAY PRODUCE UNMEASURED STRESS ON BOND E, OR REDUCE EFFECT OF INTERNAL STRESS ON BOND, F.
D-MEASURED STRENGTH OF BOND
BREAKING OF BOND BY EXTERNALLY APPLIED STRESS

THIS CHART IS QUALITATIVE, NOT QUANTITATIVE, NO SIGNIFICANCE IS ATTACHED TO THE RELATIVE LENGTHS OF THE LINES. A IS ALWAYS GREATER THAN B, AND B GREATER THAN C

*REPRODUCED BY PERMISSION OF THE PUBLISHERS OF THE JOURNAL OF CHEMICAL EDUCATION

is the type that makes bolts, nails, screws and interlocks effective.

The forces that have been discussed above that prevent complete maximum adhesion are indicated in the chart by "L". Reinhart attributes this loss entirely to incomplete wetting. There are, of course, many factors such as those described above that contribute to incomplete wetting. Thus, the strength of the bond that remains is demonstrated in the chart by "D". The internal stresses that weaken or break the bond, as discussed above, are described by "S". The useful strength of the bond is indicated by the line "C". Also, as indicated above, test methods are far from perfect, which means that the measured value "D" is either somewhat greater or somewhat less than the residual strength "C". And the extent to which this inaccuracy occurs is indicated by the lines "E" and "F".

Reference has already been made above to the fact that before adhesion can take place liquefaction of the adhesive must occur. Reinhart (6) states this somewhat differently by indicating that the adhesive must wet the surface of the adherent in order for molecular nearness to make attractive forces operative.

He lists four procedures for obtaining this requisite flow or wetting. These include the use of a solvent, increase in temperature during application, increase in pressure during application and the formation of the adhesive *in situ*. He then points out that these four procedures for liquefaction or surface wetting provide a means for classifying adhesives. Thus, where solvent is employed, the adhesive is a solvent-sensitive one and changes from liquid to solid by evaporation of the solvent. Where temperature is employed, the adhesive is temperature-sensitive and changes from liquid to solid by decrease in temperature. In the special case of delayed tack adhesives (see Glossary, Table I) the adhesive remains tacky or pressure-sensitive even after the temperature is reduced. Where increase in temperature affects liquefaction, the adhesive is classed, of course, as a pressure-sensitive adhesive, and the change from the liquid to the solid state is effected by release of pressure. Finally, where the adhesive bond is formed *in situ* the adhesive may be termed reaction-sensitive, and the change from liquid to solid forms is effected by a chemical reaction such as polymerization or condensation, and activating forces such as catalysts or heat may be employed.

The above discussion, particularly as it relates to the figure in Table II, provides a general background for the understanding of adhesion and describes some of the particular forces and factors that both contribute to and detract from the adhesive phenomenon. Obviously, there are a wide variety of other factors that must necessarily be considered. The importance of these factors is related usually to the specific type of adhesive and the specific types of bonding under discussion. And, in general, no one author who has written on this theory has included all of these factors.

Factors affecting adhesion

Del Monte (3) indicates that there is a variety of physical and chemical factors affecting adhesion. Among the physical factors are:

1. Surface tension of the adhesive.
2. Porosity and smoothness of the surfaces being bonded.
3. Physical properties of the adhesive films such as tensile strength, sheer strength, compressive strength, modulus of elasticity and creep rate.
4. Relative thickness of the adhesive film.
5. Viscosity of the adhesive film.
6. The method of applying the adhesive.

In addition to these, Del Monte lists a variety of chemical influences, which he points out have not been studied as intensively as the physical factors. Among these he includes:

1. The polarity of the surface being bonded as well as the polarity of the adhesive material.
2. Processes of polymerization, formation of by-products and influence of molecular weight.
3. Nature of side groupings on the polymer chain.
4. Thin film of gases or vapors adsorbed on the surface of the solids being bonded and on the adhesive film.
5. Evaporation or diffusion of volatiles from the adhesive films.
6. The pH of the glue line.

Some of these factors, of course, have already been discussed.

Discussion of physical factors

In discussing these physical and chemical factors specifically, it must be pointed out that the wettability of a surface is closely related to the surface tension of the wetting liquid. In addition, the viscosity of the liquid is important. In general, the lower the surface tension, the better the wetting; and, consequently, the better the adhesion. Accordingly, the factors that tend to lower surface tension must be considered in formulating adhesives. It is well recognized that unclean surfaces generally contribute to poor adhesion. On a theoretical basis it may be indicated that adsorbed gas films or films of oxide or greasy materials in general increase surface tension and thus contribute to poor adhesion.

The porosity of a surface affects adhesion because the pores or capillaries of a porous surface carry away the adhesive and make it unavailable. Similarly, a heat seal adhesive "soaks into" the paper if its viscosity is too low when treated. In particular, the more fluid or mobile portions of the adhesive are carried away, thus disturbing the balance between solvents and solute or the molecular weight distribution of a polymer. When this happens in such a way that water is removed, it is frequently advantageous—as is the case with sodium silicate adhesives, where removal of the water leaves the tacky material for the formation of the bond. In other situations, however, particularly where polymeric materials are involved, this is undesirable simply because a portion of the adhesive required for the glue line disappears.

The physical properties of the adhesive film itself are important. Thus, the measurement of tensile strength of a film of the adhesive material, particularly when that film is of the same thickness as it will be in service, is an excellent indication of how well the adhesive will actually bond.

Another physical factor that is important is the modulus of elasticity, which is a measure of the resistance of the substance to deformation under load. A modulus at the glue line comparable to that of the materials being bonded together is, of course, highly desirable. This is difficult to achieve because of the marked difference between most adhesives and the materials that they glue together. Creep under stress and thermal coefficient of expansion are other important properties that give an indication as to how the adhesive will perform. The method of application of the adhesive and the formation of the adhesive bond contribute to ultimate adhesive strength. For example, pressure, temperature and time are three factors that have a marked bearing on the final strength of the adhesive.

Discussion of chemical factors

The first of the chemical factors listed by Del Monte (3) is polarity. It has generally been accepted that polarity greatly influences adhesive strength, and there is much practical evidence that shows that highly polar compounds can be formulated into good adhesives. The epoxy and the urethane resins are examples. Similarly, the phenolics, urea resins and cellulose derivatives are all highly polar, whereas polystyrene and polyethylene are examples of the materials with low polarity. Obviously, the former are better adhesives than the latter. There

(Continued on page 644)

Standard cost accounting for paper mills

EDWARD W. ROGERS, Partner
Cassel, Groneweg, Rohlfing & Clark

Part II — Installation of a standard cost system

INTRODUCTION of standard cost methods into any company will require the skills of accountants, engineers and managers and will also require a careful blending of those skills. Since the primary purpose of standard cost methods is to serve management, it follows that the manager and his staff must actively participate in the planning and designing phase of the program. The needs of management must dominate all of the objectives of the program, and the personal preferences and bias of individual managers must be carefully considered and taken into account.

In most standard cost installations the leadership is taken by the accountants, who furnish over-all planning of the procedures and methods to be used, and who develop the procedures for compiling detailed cost figures and integrating the cost accounting with the general accounting system of the company. It is quite proper that accountants should take the lead in planning and organizing the program, but they must search for practical and economical procedures and must subordinate their usual zeal for exactness. They must use many figures that are approximations and estimates, so that it is foolish to pretend that conclusions can be completely accurate; fortunately, if the estimates and approximations have been carefully made a satisfactory degree of accuracy is attainable. In most cost accounting procedures slide rule accuracy is adequate, although cost accountants are prone to use calculating machines that carry the results out to ridiculous lengths. It is quite common for cost accountants to show the cents on a $10,000 figure, or to use a $10.00 figure with three or four digits to the right of the decimal point. In either case, it is preposterous to pretend that the cost calculations can be that precise, and the accountant should know, if anyone does, just how silly such practices are.

The managers and the engineers, who are accustomed to using slide rules for calculations, are not so apt to err in the same direction, but will often be satisfied with answers that are not precise enough. This often happens in such matters as production records or records of material used that have been prepared in a routine fashion for many years. As errors, misconceptions and faulty practices crop up, the resulting fallacious conclusions are often accepted by management, since no one tries to police and correct the figures. When standard cost methods are used, the detailed production figures, in terms of quantities used or produced, must be reasonably accurate in detail and must be carefully compiled and totaled. The accountants' habits of crossfooting, using control totals and using other verifying techniques must still be applied, but must be applied with judgment and discrimination. As a generality, the accountant must avoid spending too much time and effort to obtain an unneeded degree of accuracy, while the operating people must learn how to get a satisfactory degree of accuracy in production reports and must get in the habit of handling and compiling production figures with prudence and care.

Installation of a standard cost system

Installation of standard cost methods requires the services of accountants, engineers and managers and a great deal of cooperation between the various individuals and professions. It also requires the compilation and analysis of a great deal of information. For these reasons the installation process is sure to extend over a number of months and may take much longer.

The time and effort required for the installation of standard cost methods create a manpower problem in any company; this problem can be met in several ways. If the company's own personnel supply most of the manpower required during the installation period (which is usually the most satisfactory arrangement), the work is bound to go rather slowly, as each individual will continue to spend part of his time on his normal duties. If management feels that the need for the standard cost methods is urgent and pressing, outside accountants and engineers can be hired to design and install the system. Handling the program in this fashion will reduce the demands upon the company's own accountants, engineers and managers, but those demands will still be heavy, as the outsiders will require a great deal of information and advice from those familiar with the company's operations. A great deal of planning and forecasting is inherent in the standard cost program, and that planning and forecasting must be done by the responsible executives and supervisors within the company under the guidance of the accountants and engineers. A crash program, involving major participation from outside accountants and engineers, may succeed in producing a satisfactory standard cost system, but there is a good deal of risk that the project will fail to obtain all of the expected benefits.

An alternative installation program would involve a much longer period of time in designing and installing the standard cost procedures, but will have a considerably better chance of success. The company might detail a single accountant, or a very small group of engineers and accountants, to develop the cost accounting procedure and to plan and supervise the compilation of the necessary data for standards and budgets. If the company has no individual accountant who can be freed for such duties, and who has the necessary background and qualifications,

it would be prudent to retain a consultant for the planning and installation phase of the program. If properly planned and organized, the standard cost accounting methods could be explained to the company's managers, accountants and engineers as the system was being assembled; if those same managers, accountants and engineers participated in phases of the program, such as compiling and analyzing the necessary cost and operating data, they should get an excellent understanding of the objectives and techniques that will be used. The company personnel would have the opportunity to develop an understanding of the standard cost methods gradually over an extended period and would understand the methods more completely and intimately, which would improve the chance that the system would operate satisfactorily.

A gradual approach to standard costs

It is often practical to approach standard cost methods gradually by applying standards to a few operations at a time as the necessary data can be compiled and analyzed. Many successful systems apply standard cost methods in some areas, and for some operations apply historical job cost methods, or some other cost accounting techniques. Such hybrid systems are probably more common than complete standard cost systems, and the hybrid system is often accepted as the permanent solution to cost accounting problems—and not just a temporary stage in the development of a complete standard cost system. Where hybrid systems are used, they may provide excellent figures for cost finding purposes, but they inevitably omit some of the cost control that is supplied by standard cost methods. However, in any company there are operation or functions that require very little control, or where the most precise cost control will not accomplish significant savings. In such cases, application of standard cost methods would be of slight benefit, and other cost methods would be satisfactory.

Limitations on the use of standard cost methods

There may be other compelling reasons for using standard costs on a limited basis only. Most operations in a manufacturing company are repetitive to some degree at least; even if the entire operation is not repeated, it usually can be broken down into sub-operations that are largely repetitive. When there are exceptional operations that do not conform to this pattern, it would be expensive and wasteful to establish standards on each operation; for operations of that nature it would be practical to use cost accounting methods that apply costs to the actual time required to perform the operation.

There are many accountants and managers who still believe that historical cost methods produce "actual" cost figures and refuse to accept any other cost methods. If a manager, or responsible accountant, who holds such beliefs is influential enough and tenacious enough, he may force modifications of orthodox standard cost methods, so that standard cost figures for products are modified to include portions of the variances, which are allocated to products on some basis or other. Quite often such circumlocutions are necessary to get limited acceptance of standard cost methods.

In many cases expediency dictates compromises with standard cost principles and results in cost accounting systems that may be called "standard cost systems", but which are not at all representative of what standard cost systems should be. To the uninformed manager or engineer or accountant acquaintanceship with such systems may create impressions and false conclusions that crystallize into grossly mistaken notions about the standard cost idea.

Myths about standard costs

For the reasons mentioned above, and for many other reasons, it is quite common to find managers and accountants who do not understand the standard cost idea and may have some rather violently mistaken versions of what standard costs are all about. Some of the misconceptions are serious enough—and common enough—to deserve explanation and rebuttal. The most common myths, which have formed around the standard cost idea:

Standard cost methods will require much larger accounting and clerical staffs:

If a company has a reasonably comprehensive cost accounting system, adoption of standard cost methods should not increase the clerical requirements, although the new methods will perform cost control and cost forecasting functions that were not available under the old methods. In many ways use of standard cost methods will reduce the amount of clerical work involved in cost accounting procedures.

Standard cost methods are not practical unless products are standardized, and such methods will not work where there is a great variety of finished products:

Standard cost methods involve establishing a standard cost for each operation and each material item and each other cost component that is required to produce a finished product. If each of these cost components is used repeatedly, standard cost methods are feasible, even if there are many combinations of these components, so that the number of finished products is very large. Very definitely, standardization of products is not necessary for a successful standard cost system.

Standards will be set for many operations that are performed only once, thus wasting time and money:

As has been discussed above, where operations are non-repetitive (in whole or in part), standards need not be established, and other cost accounting techniques are adequate.

Standard costs are inflexible; once they are established, it is impossible to change them:

The difficulties involved in changing standards are often grossly exaggerated, but it must be admitted that changes are time-consuming and tedious. As a practical matter, standards usually remain unchanged for a full year, and it is customary to change standards only when there have been substantial changes in individual cost components, or when the cumulative effect of many small changes has become substantial. In the paper industry changes in standards can be accomplished with the expenditure of a moderate amount of effort and should not be burdensome. It should be remembered that the calculations required for changing standard product costs are the same calculations that are made month-by-month under typical historical cost accounting systems.

Standard cost methods require too much time in setting standards and budgets, and in making forecasts:

The standard cost idea is based on the assumption that planning is an essential management function; in fact, most companies suffer from too little forward planning, not from too much. Establishment of standard costs requires a great deal of planning and demands much time from many people to secure that planning, but this is a very great benefit from the program, not a defect. In almost any case, the planning and forecasting required for a standard cost system would be worth far more than its cost, even if standard cost methods were never used.

To be concluded in the January issue of THE PAPER INDUSTRY.

The use of pipe, fittings, pumps and valves in the pulp and paper industry

ROLAND L. ALLEN JR.
Vice President, Eastern Engineering Co.

Part VII—Application of pipe, fittings, valves and pumps in black liquor evaporation, chemical recovery and cooking liquor preparation

THE BLACK LIQUOR evaporation, chemical recovery and cooking liquor preparation areas of a kraft pulp and paper mill offer service conditions that are the most severe in the plant in relation to corrosion, except for the bleach plant with its supporting chemical systems.

These areas are closely related and, in general, present many of the same problems in relation to piping and pumps. The evaporators have piping services for storage and concentrated black liquor, steam and condensate (both clean and contaminated). The chemical recovery system has piping services for steam (both low-and high-pressure), concentrated black liquor, clean condensate and raw green liquor. The cooking liquor preparation (recausticizing) area has piping services for steam, raw green liquor, clarified green liquor, white liquor and lime mud. Both the chemical recovery and cooking liquor preparation areas require piping for fuel oil or gas service. The fuel service for the chemical recovery area is normally required only for start-up to light-off the recovery unit, while the lime kiln associated with the lime reburning portion of cooking liquor preparation requires continuous fuel service.

Evaporators

Piping on the liquor side of the black liquor evaporators should be type 316 stainless steel on the first one or two effects (concentrated liquor effects), while that on the other effects may be carbon steel. In addition to type 316 stainless steel, carbon steel pipe with nickel internal cladding has been used with success. The strong black liquor supplied to the evaporators may be handled in carbon steel piping; while the concentrated liquor from the evaporators to the concentrated liquor storage tank should be type 316 stainless steel.

Valves used for the strong liquor feed may be all cast iron, cast iron with stainless steel trim, 3-per cent nickel cast iron with stainless steel trim or all ni-resist. The 3-per cent nickel cast iron valve with stainless steel trim is probably the most economical choice from the standpoint of first cost and service life.

Valves used for the concentrated liquor should be 3-per cent nickel cast iron with stainless steel trim, ni-resist or type 316 stainless steel. The ni-resist valve is probably the most economical for this service from the standpoint of first cost and service life.

The steam, clean condensate and contaminated condensate may all be handled in carbon steel piping. All may employ cast iron valves with stainless steel trim. The steam and clean condensate may employ cast iron valves with bronze trim.

The piping connected to the liquor pumps for the various effects of the evaporators should be equipped with bellows-type stainless steel expansion joints so that excessive thrusts will not be transmitted to the pump through the suction and discharge connections.

Pumps to handle liquor at the various effects should be selected with care. These pumps should be constructed of an alloy suitable for hot caustic service such as Worthite or type 316 stainless steel. These pumps should have a very low required net positive suction head since they are required to handle liquor at temperatures approaching flash temperatures for the suction pressure encountered.

Recovery unit

The concentrated black liquor piping from the storage tank through the venturi scrubber or cascade evaporator and precipitator (as the case may be) to the burners should all be type 316 stainless steel. Carbon steel has been frequently used, but it does not last long enough even when schedule 80 or heavier wall thickness is used to make it economical. In addition, carbon steel presents a hazard to operating personnel due to the danger of sudden leaks of hot high-pressure liquor from the piping around the burners.

The high-pressure steam piping may be carbon steel or alloy steel depending upon the steam temperature. This piping, along with the necessary boiler feed water piping, is the same as that used on the power plant main steam and boiler feed water.

The raw green liquor from the smelt dissolving tank may be handled in carbon steel pipe; but many mills have found that type 316 stainless steel pipe with stainless steel or ni-resist valves is more economical in the end.

Valves for both the raw green liquor and the concentrated black liquor should be of the plug type. Gate valves are not very satisfactory for these services. The raw green liquor contains solids that score the gate valve seat surfaces and settle under the gate and prevent tight shut-off.

Raw green liquor piping should be provided with sufficient flanged connections to allow periodic clean-out of encrustation from the inside of the system. This encrustation may be reduced very greatly by inter-connecting the weak wash line from the recausticizing area to the smelt dissolving tank with the raw green liquor line from the smelt dissolving tank to the recausticizing area. By this inter-connection each line can periodically be used for raw liquor service, while the other line is in weak wash service. The weak wash tends to dissolve some of the solids deposited by the raw green liquor. A few mills have successfully used rubber hose for raw green liquor service. Rubber hose allows removal of encrustation without taking the line out

of service, since it is possible to break the internal accumulation by hitting the outside of the hose along its entire length with a hammer. However, this has not proven to be a satisfactory or economical solution to the problem in every case.

Recausticizing and lime reburning

The white liquor manufactured in the recausticizing area for use in the wood chip digesting area is corrosive to carbon steel piping—particularly when hot. Carbon steel piping has been used extensively for this service in the past but has been troublesome and limited in service life even when heavy—wall carbon steel piping was used. In recent years many mills have found it economical to use type 316 stainless steel piping for this service with a resulting elimination of the majority of maintenance problems. Many mills have used type 316 stainless steel valves; but ni-resist plug type valves are probably the most economical in both first cost and maintenance cost. Ni-resist or stainless steel gate valves may be used for service with well-settled white liquor.

The green liquor piping services in the recausticizing area are identical to those in the recovery area, and the same piping materials are used.

No brass, bronze or copper should be used for any of the services in the evaporator, recovery and causticizing areas. These materials fail rapidly in caustic services to the extent that they may last no more than a few days or even hours.

The lime mud or sludge settled out of the white liquor is handled in carbon steel piping with plug valves of cast iron or ni-resist construction. A liberal number of water flush connections should be provided with the water shut-off valve adjacent to the lime mud line of the plug-type of cast iron or ni-resist construction.

The lime kiln that reburns the lime mud to form unslaked lime is normally fired with oil or gas. The piping for these services should be carbon steel with cast iron or cast steel valves. Plug valves are frequently used on both gas and oil. They are particularly well suited for gas service, if they are of the lubricated type, and will give satisfactory service on oil lines. Gate valves of a type designed for gas service are satisfactory. If gate valves are used on oil service, they should have stainless steel trim.

Conclusion

The majority of piping in the evaporator, recovery and recausticizing areas is 8 in. and smaller. The major exception to this is the large-diameter low-pressure steam and vapor piping on the evaporators. Since this piping is of small size by the usual pulp and paper mill standards, it should be designed and constructed in such a manner and of such materials as will give the best service. Only a very small percentage of the total construction cost of these areas could be saved by utilizing the cheapest materials obtainable. In fact, the savings in initial cost would probably be less than ½ of 1 per cent.

The same general statement applies to pumps for the various services in these areas. With the service conditions being both corrosive and abrasive (for most of these services), pumps should be heavy-duty units constructed of suitable alloys. A cheap pump will result in expensive maintenance, considerable lost production time and will usually require replacement in a relatively short time.

Sonoco Products' new corrugating board facilities

(Continued from page 589)

A pneumatic cinder rejection system efficiently returns fly ash from the boiler hoppers for refiring. Special sand and cinder separators remove abrasive sand from the dust collector hopper.

The dust collector itself is a multi-tubular type 5RWS, equipped with 5-in. dia. white cast iron tubes. Its performance efficiency is 95.8 per cent on fly ash in which 50 per cent of the particles are less than 10 microns in size.

A single-pass tubular air heater with a heating surface of 20,600 sq. ft. is side-connected with the dust collector. Fly ashes from the dust collector hoppers are handled by a Hydroveyor pneumatic conveyor discharging to the same sluice system serving the ash pit hopper.

Boiler feed water is deaerated in a 275,000-lb./hr. deaerating feed water heater that hase a 10-min. storage capacity. The heater is equipped with 18 gauge stainless steel trays, a flanged stainless steel spray nozzle and stainless steel enclosure.

The two double-case boiler feed pumps with horizontally-split, double volute inner case are rated at 322,000 lb./hr. each at a differential pressure of 1585 psi. One pump is driven by a steam turbine and the other by an induction motor. The single-stage, 900-hp steam turbine is an E-125 unit and directly connected to the pump for efficient operation. The induction motor is a 900-hp drip-proof squirrel cage type motor.

The 12,500-kw automatic double extraction steam turbine-generator is designed for initial steam conditions of 1250 psi pressure and 950° F. Steam is automatically extracted at 373 psi and 150 psi, with uncontrolled extractions at 200 psi and 40 psi.

The turbine-generator is served by a 9500-sq. ft. cylindrical two-pass condenser designed to condense 85,000 lb. of steam per hour. The condenser is equipped with a "Tube-jet" air ejector that operates at 125-psi and 515 F.

Power distribution and motor controls

The power distribution system consists of a 3750-kva indoor master unit substation including a 13.2-kv transformer, a bus-entrance unit, four 2.4-kv, 100-mva, 1200-amp metal-clad equipments; a 3750-kva outdoor master unit substation including a 13.2-kv transformer, a bus-entrance unit, two 2.4-kv, 100-mva, 1200-amp metal clad equipments; a duplex panel; seven 13.8 indoor 500-mva, 1200-amp metal-clad equipments; a 1500-kva indoor load center unit substation and a 480-v indoor drawout switchgear.

Slipsyn high-voltage fused starters provide system fault protection, motor overload protection and personnel protection on the refiner motors, jordan motors and vacuum pump motors.

This control automatically synchronizes the motor by applying the field at the proper motor speed and the most favorable rotor position, taking advantage of the maximum synchronizing torque the motor is capable of producing.

Modern Trends in STORING and HANDLING CLAYS

Recently the Georgia Kaolin Company Research and Engineering Departments prepared this bulletin reviewing most of the principal methods of handling bulk clay in paper mills today.

Special emphasis has been placed on the efficiency and economy in handling, pumping, and storing of clay slurried directly from the railroad car.

Paper mill engineering staffs studying the expansion or modernization of their bulk clay handling plants will find the charts, tables, and data contained in this bulletin very useful in planning their future systems.

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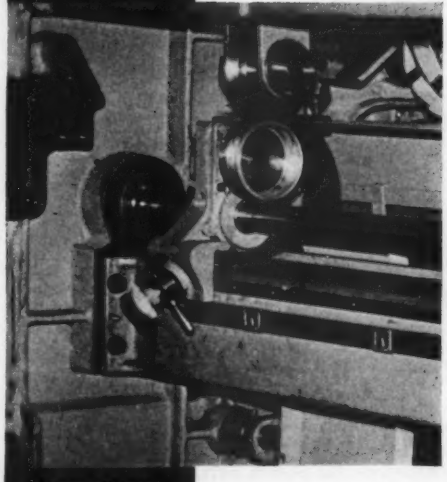
JAGENBERG

JAGENBERG Duplex Sheet Cutter Model DQSM

Sheet Cutters



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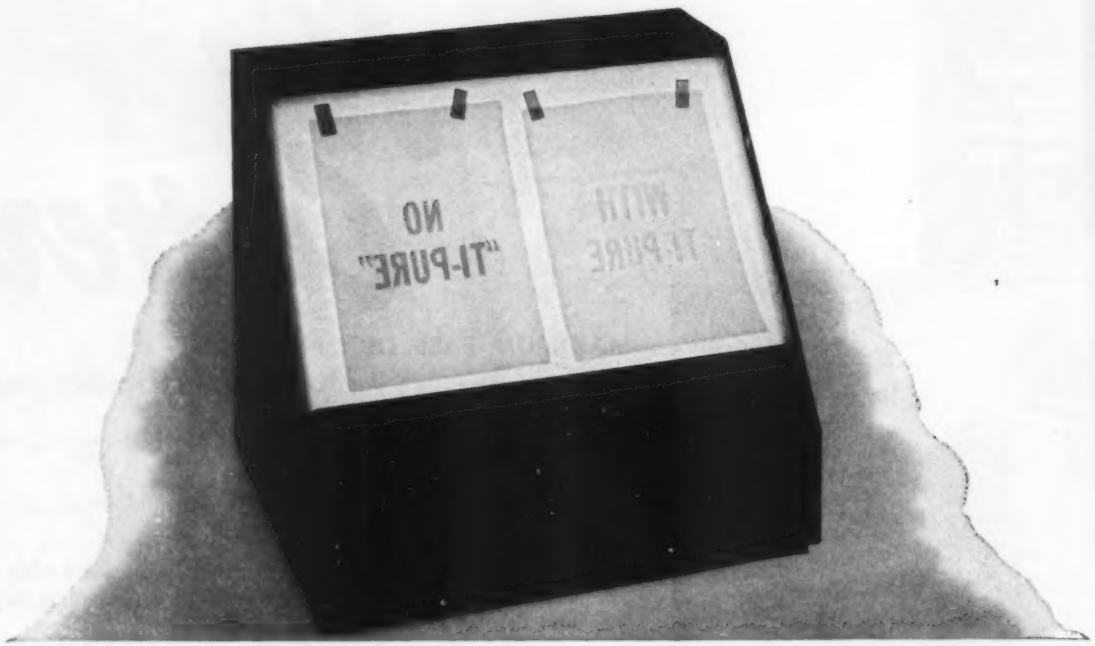
overcome show-through



SHOW-THROUGH RESISTANCE of "Ti-Pure" LW is demonstrated in the above illustration with sheet at right. Papers pigmented with "Ti-Pure" LW display minimum show-through . . . an important sales advantage for your lightweight papers, particularly.

Progress in Pigments

DU PONT TI-PURE® LW

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Publishers . . . faced with rising postage costs . . . can maintain quality and reduce magazine and catalogue weight by using a lower basis weight sheet made with "Ti-Pure" LW titanium dioxide pigment. This anatase pigment brightens and opacifies . . . will help you meet rigid customer requirements for sharp color reproduction. Result—maximum show-through resistance in a lower basis weight sheet and *reduced postage costs.*

EASILY DISPERSED—Added to the beater, "Ti-Pure" LW displays even distribution throughout the sheet and good wet-end retention. To get maximum opacity you can rely on this even distribution throughout the pulp prior to formation of the paper web. Added at the calender or size press, "Ti-Pure" LW combines ease of dispersion with low water and adhesive demand to produce glossy coatings of high brightness and minimum show-through.

TECHNICAL ASSISTANCE is always available from Du Pont to help you solve a pigmenting problem. Our large, new, completely equipped paper laboratory is at your service. For further information, consult your Du Pont Pigments Representative, or write: E. I. du Pont de Nemours & Co. (Inc.), Pigments Department, Wilmington 98, Del. In Canada: Du Pont Company of Canada (1956) Limited, P.O. Box 660, Montreal, Quebec.

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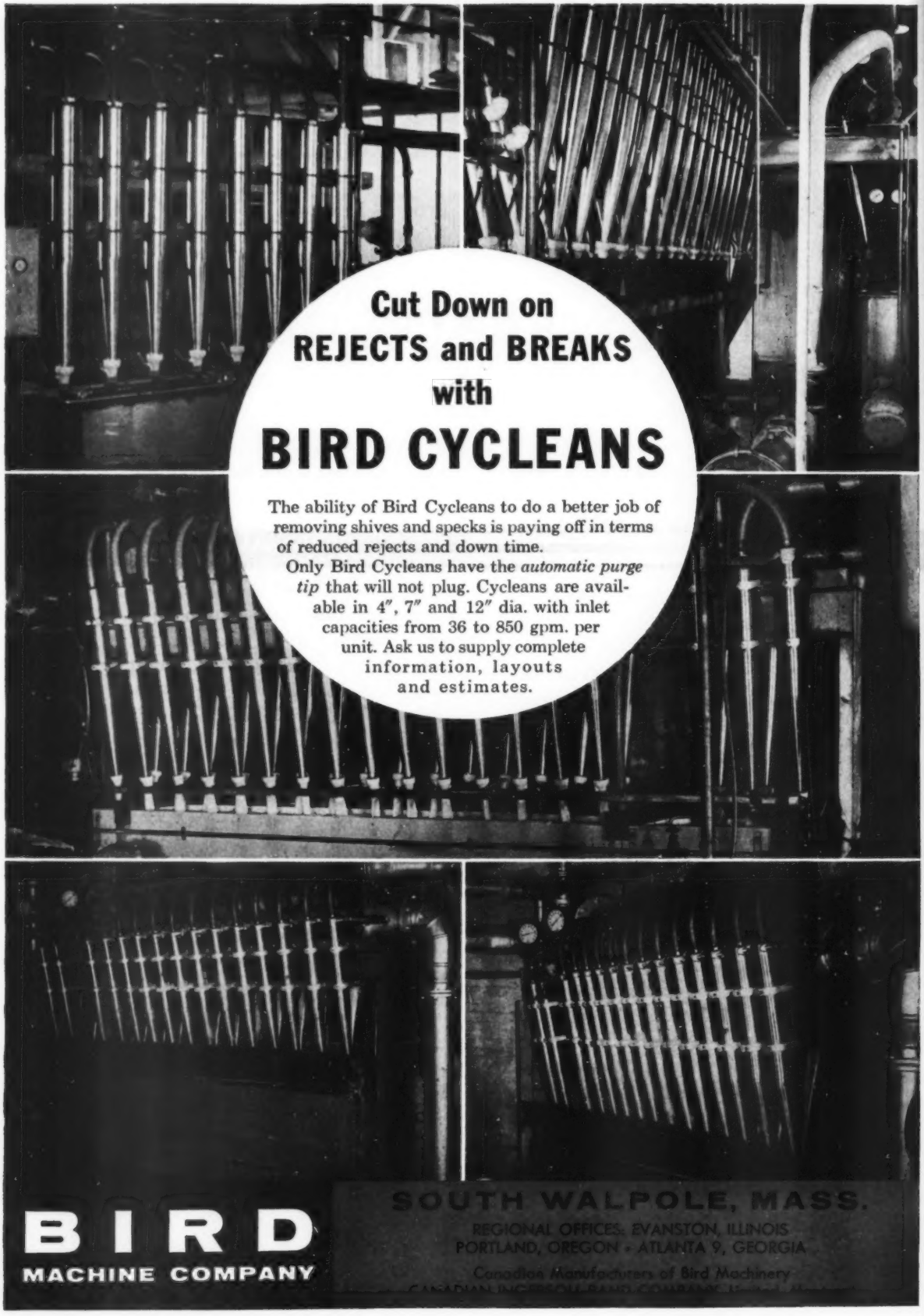

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1958

CURRENT COMMENTS

1959 prosperity . . . reciprocal trade agreements . . . and a new association

by WARREN B. BULLOCK

An increase in advertising appropriations of 11 per cent in 1959 over the 1958 budgets is reported in a survey of future plans of major advertisers. An estimated outlay of a billion dollars next year is a certain indication of future gains in sales by the paper and paperboard mills both in the publication field (where the advertising dollar is spent) and in the packaging field (where goods for consumption are wrapped or boxed).

This is only one in a series of announcements and reports that indicate not only that 1959 presages prosperity but even an eventual boom in the paper industry.

Paperboard production in a single recent week reached an all-time industry high of 317,809 tons, nearly 9 per cent higher than the comparable week a year ago.

The Department of Commerce forecasts a total 1958 production of paper and paperboard of 30,700,000 tons, equal to the 1957 total. John R. Kimberly, president of Kimberly-Clark Corp., in his first public appearance as president of the American Paper & Pulp Association told the New York division of the paper salesmen's association that he anticipates an output of 32,5000,000 tons in 1959, an all-time high.

A. B. Layton, president of Crown Zellerbach Corp., tells of a "tremendous increase" in orders; and D. J. Hardenbrook, vice president of Union Bag-Camp Corp., says inventories are "right down to the bone."

Major gains over 1957

A flood of financial reports for the third quarter of 1958 carries out advance estimates of major gains over 1957. Some companies even report that the first nine months of the year showed income gains over the first three quarters of 1957, and even more show increases in the September quarter alone.

Among the companies showing gains over 1957 are St. Regis, Crown Zellerbach, Scott, Albemarle, American Writing, Fibreboard Paper Products, Sealright-Oswego Falls, National Vulcanized Fibre, S. D. Warren, Container Corp., Keyes Fibre, Puget Sound Pulp & Timber, Bemis Bros. Bag and Fort Wayne Corrugated, with some such giants as International and Kimberly-Clark yet to publish their figures. Georgia Pacific showed an income gain of $750,000 in the September quarter over the second quarter, most of which was ascribed to the operations of the company's new paper mill at Toledo, Ore.

New mergers

Several new mergers have been announced, further indication of the manner in which the larger paper companies are integrating their production and converting facilities as well as adding smaller companies to their major divisions. Mead has announced it will take over Wrenn Paper with its 30 daily tons of absorbent and impregnating papers. St. Regis will give 2¼ shares of its common stock in exchange for each share of F. J. Kress Box of Pittsburgh with sales of $20,000,000 a year. Watervliet Paper of Watervliet, Mich., with its two book paper machines is now a division of Hammermill Paper.

Oxford Paper has floated a $10,000,000 loan through a Wall Street syndicate to partly finance its projected capital improvements that will cost $15,000,000 by the end of 1962. American Israeli Paper Mills has secured a loan of $3,000,000 from the Export-Import Bank to be spent in this country for manufacturing equipment in its projected $10,300,000 expansion program.

International negotiations

The United States in furtherance of its plan to arrange tariff rate reductions through reciprocal trade agreements has proposed the summer of 1960 as the date for the opening of negotiations. The proposed conference, which will finalize this country's authority to reduce United States tariff rates as much as 20 per cent, will be the largest international bargaining session ever held and is expected to continue approximately one year. In legislative debates over the tariff-cutting authority conferred upon the President it was hinted (if not actually pledged) that United States business, agriculture and labor would for the first time be allowed to take an active part in the international negotiations. The suggestion of 1960 as the bargaining date means that there will be no further tariff cuts in United States duty rates until late in 1961, unless such changes develop through Congressional action.

United Wallpaper will go far beyond the production of wallpaper and colors for its parent company, Sears Roebuck. It plans to diversify its output—even to the manufacture of nose cones and the far different field of manufacture of ladies' hair spray.

Absorbents covered

A new trade association has come into the United States paper industry picture with the formation of the Absorbent Paper Manufacturers Association to cover impregnating, saturating, filter, blotting, imitation leather board stock and similar products. Companies participating in the formation of the new association include Albemarle, Rochester, Sorg, Standard, Wrenn and Joseph Parker & Sons.

Financial Reports

Behavior of paper mill securities in the stock exchanges varied during late October and early November depending, apparently, on the manner in which traders interpreted the earning capacity of the various issues. Some rose sharply, but many showed fractional drops as compared with a month previous.

Net Incomes

Allied Paper Corp.—For the September quarter, $190,990; a year ago, $198,243.

American Writing Paper Corp.—For the

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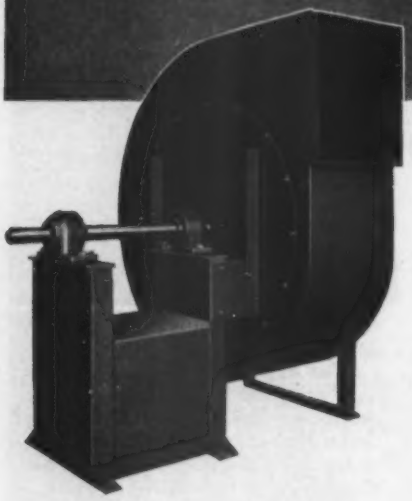
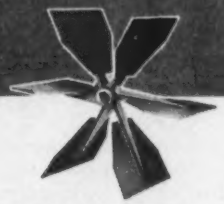
Clarage Industrial Air and Material Handling Fans





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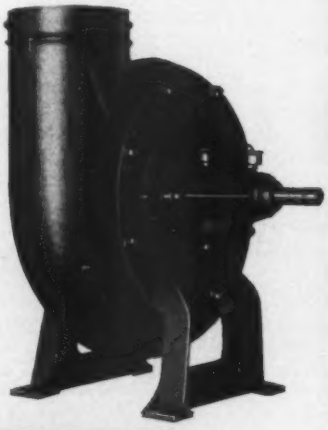

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Current Comments . . .

third quarter, $160,144; a year ago, $136,269.

Bemis Bro. Bag Co.—For three quarters, $1,868,000; a year ago, $1,328,000.

Bergstrom Paper Co.—For the nine months to September 30, $508,582; a year ago, $719,482.

Central Fibre Products Co.— For the year ended June 28, $3,182,684; for the previous fiscal year, $3,571,512.

Paterson Parchment Paper Co.—For nine months, $342,802; a year ago, $387,329.

Puget Sound Pulp & Timber Co.—For nine months, $2,320,911; a year ago, $2,325,920.

Riegel Paper Corp.—For 39 weeks ending September 30, $2,055,907; a year ago, $2,050,724. (The 1958 figure includes a capital gain of $321,000 from the sale of timberlands.)

River Raisin Paper Co.—For the first half-year, $288,000; a year ago, $308,000.

Stock and Bond Quotations

New York Stock Exchange — Stocks

Closing Prices	Nov. 10, 1958	Oct. 10, 1958
American Can (Marathon)	49¼	51¼
Same Pref.	39	38¾
Celotex	33	33⅜
Same Pref.	17⅛	* 18-18¼
Certain-Teed	13⅛	12⅞
Champion P & F	42	41
Same Pref.	93½	* 94½-95
Chesapeake	* 37⅛	38
Container	29⅛	25⅝
Same Pref.	* 90-92	* 86-90
Continental Can	60⅜	54½
Same Pref.	* 83-84½	85
Crown Zellerbach	55⅝	55¾
Same Pref.	93½	94
Diamond Gardner	31¾	32⅞
Same Pref.	30⅞	31
Federal Paper Board	46⅝	47½
Same Pref.	21	* 21½-21¾
Fibre Paperboard	42⅞	39
Same Pref.	148	128
Great Northern	52¾	54½
Hammermill	30¼	31
International	121	116½
Same Pref.	* 91½-93	88
Kimberly-Clark	68¼	63⅜
MacAndrews & Forbes	28¼	29½
Masonite	35⅝	36
Mead	44½	45⅜
Same Pref.	* 92½-94½	* 93-95
Minnesota & Ontario	34⅝	35¼
Oxford	35½	34¼
Same Pref.	* 90-92½	* 88½-90
Rayonier	21	20⅜
Riegel	* 38-38¼	35¼
St. Regis	44⅜	43⅛
Same Pref.	* 96½-97	* 93⅛-94¼
Scott Paper	74	69
Same $4 Pref.	95½	* 93½-95½
Same $3.40 Pref.	* 75-77	* 78½-80½
Sealright	38¾	40¼
Standard Packaging	23⅜	22¼
Same $1.60 Pref.	* 68½-71	68½
Same $1.20 Pref.	29¼	28½
Sutherland	39½	40¾
Union Bag-Camp	42¾	39
United B. & C.	29	31½
United Wallpaper	8¾	7¼
Same Pref.	* 16-19¼	* 15½-15¾
U. S. Gypsum	96½	88¼
Same Pref.	*155-158	*158-159
West Virginia	41¼	43⅜
Same Pref.	* 98-100	101

New York Stock Exchange — Bonds

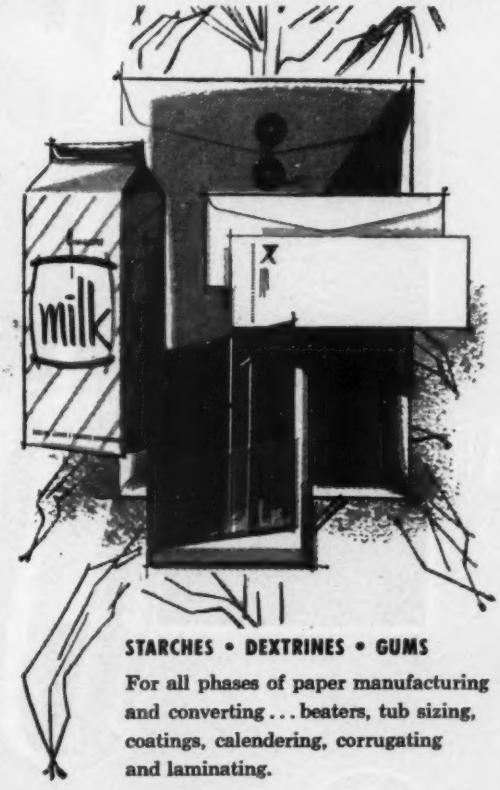
Champion P. & F. 3¾%	—	—
Champion P. & F. 3%	95	—
Kimberly-Clark 3¾%	93⅞	95
Mead 3%	—	—
Scott Paper 3%	105¾	104⅛

American Stock Exchange — Stocks

Allied Paper	9¼	9
American Writing	25⅝	28½
Brown	13	12⅝
Puget Sound	18	19

*Closing Bid and Asked Prices.

Look what happened to the corn we took off the cob



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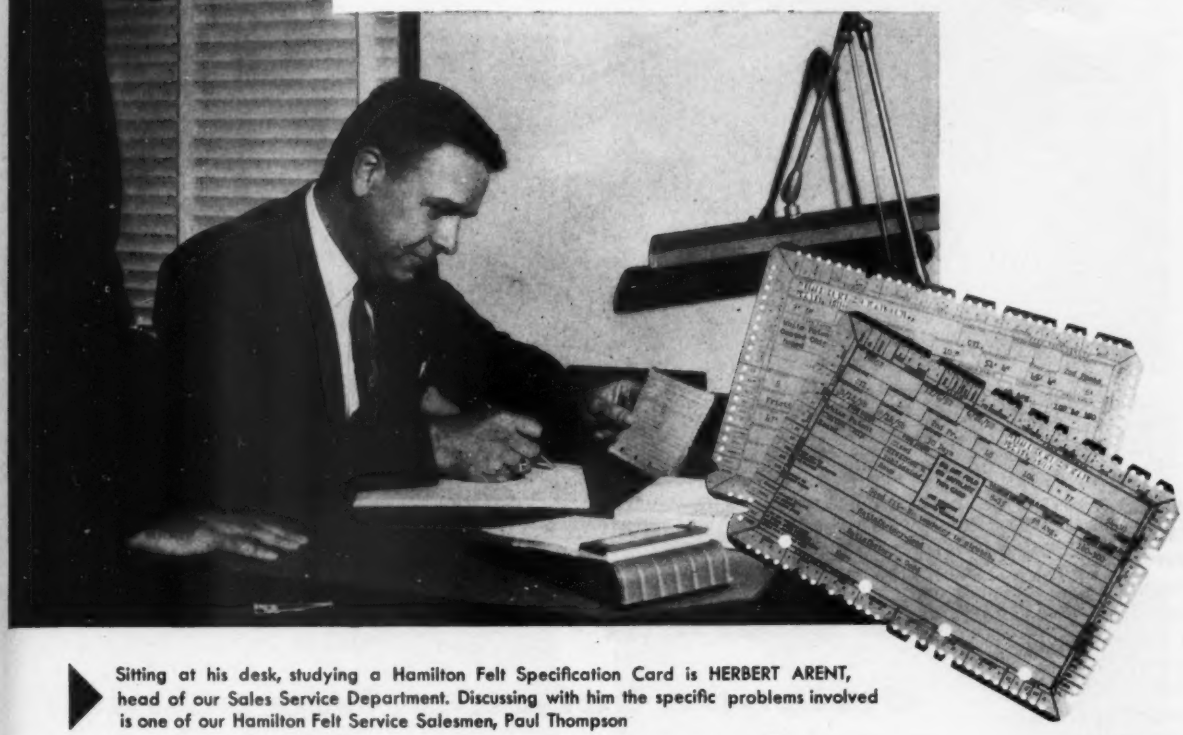

Sitting at his desk, studying a Hamilton Felt Specification Card is HERBERT ARENT, head of our Sales Service Department. Discussing with him the specific problems involved is one of our Hamilton Felt Service Salesmen, Paul Thompson

Manufacturing Hamilton Felts is a technical job requiring precise information. No two paper mills are faced with exactly the same paper-making machine problems.

But certain felt problems *do* pop up again and again.

That's why *we* keep machine specification and performance record cards for every felt we make.

At any time we can go into our files and sort out similar felt performance data for similar problems.

Minor difficulties can thus be corrected before they occur!

In the case of *your* felt order, all details and specifications of each of *your* paper-making, or board-making machines . . . and all details of the job each of your felts must do are recorded on specially punched cards.

Your carefully woven Hamilton Felts are first triple-checked in our own mill . . . then studied, in action, on your machines and the results compared with the performance of the same styles and patterns used in similar positions to make similar grades of paper, kraft or board.

As all facts are recorded on a second special punched performance card and filed, you can be sure that whether you order by phone, telegram, letter or after a Service Salesman's visit, you will get the same identical long-lasting felt performance you want—every time!

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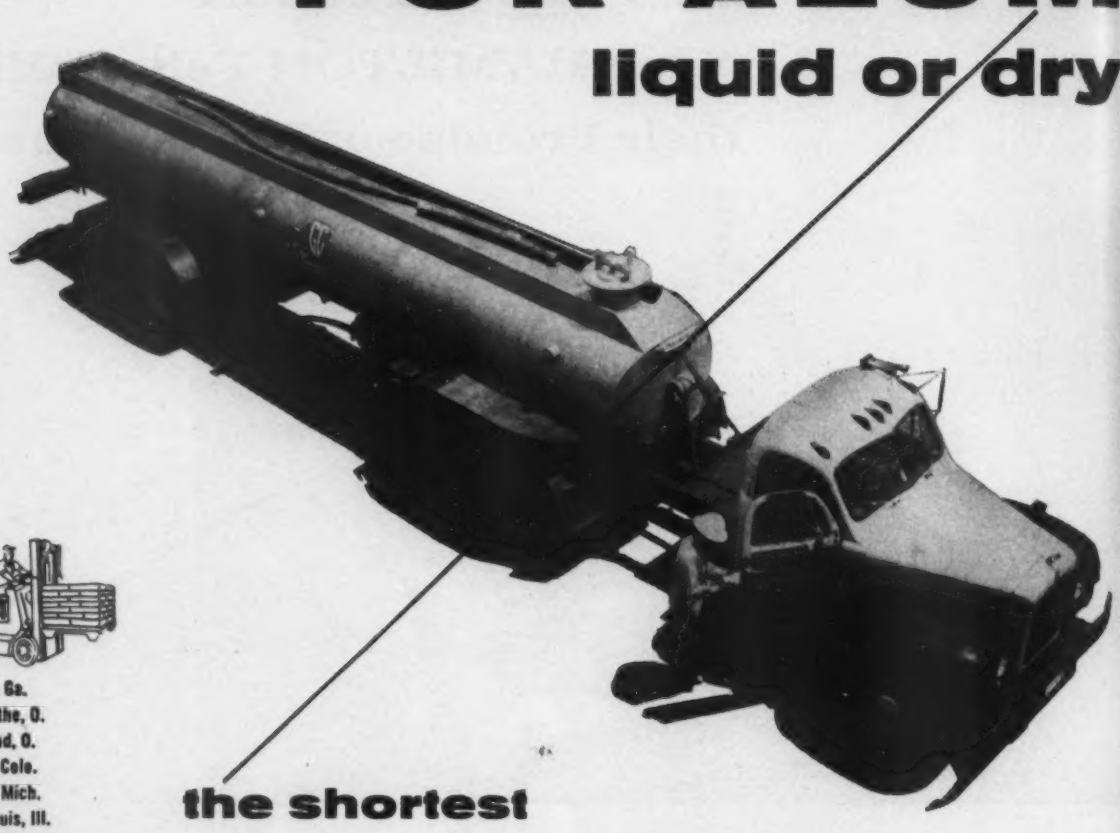

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Check the list of General Chemical's dry or liquid alum producing locations at left. Chances are one is convenient and close to you. In addition to these plants, our chain of warehouses across the country makes stocks of dry aluminum sulfate readily available in every major center of commerce. Write or phone for information on how we can serve you.

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Basic Chemicals for American Industry

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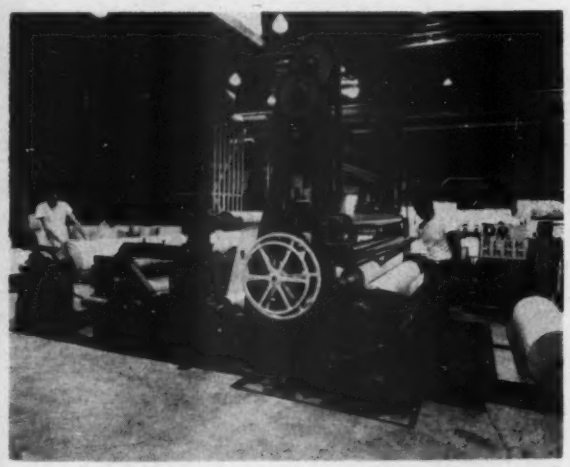
NEWS of the INDUSTRY

PART OF THE new wet end and press section installed on one of the two original fourdrinier machines at Hartford City Paper Co. Both machines have been completely renovated and remodeled.

REBUILT STOCK preparation system provides not only the most modern and efficient equipment, but also physical facilities permitting more flexible operations and economical maintenance.



ONE OF TWO NEW Cameron slitters in operation at the Indiana mill was part of the recently completed renovation and modernization program. The units provide constant automatic tension control.

AT THE PROCESS CONTROL section located in the stock preparation room precise control is maintained over all stock to insure that proper specifications and quality standards are achieved.

Two-year Renovation Ends at Hartford City

Installation of "the largest supercalender presently producing glassine paper in the United States" has brought to completion a two-year renovation program at Hartford City (Ind.) Paper Co.

The 16-roll unit services the firm's three paper machines, which trim net from 76 in. to 100 in. It was purchased from Joseph Eck & Sons of Germany through Rice Barton Corp. of Worcester, Mass., and is balanced to run at 1000 fpm. Nip pressure on the king roll is 3000 lb. per lineal inch.

The renovation program at this Indiana subsidiary of Minnesota Mining & Mfg. Co. was undertaken in 1955. In addition to glassine and greaseproof specialties, Hartford City produces the basic stock for copy papers manufactured by Minnesota Mining's Duplicating Products Div.

Other major phases of the renovation have included the installation of a third fourdrinier machine—Black-Clawson Co. (reported in a previous issue of THE PAPER INDUSTRY), the complete modernization of the firm's two original machines, the installation of a completely new stock preparation system and major plant rebuilding.

Laboratory facilities have been greatly expanded, and completely modern equipment is now employed

HIDDEN BENEATH this stream of wet and normally slippery pine chips is a rubber conveyor belt cover that "looks like an expanded tire tread design". In use at the Crossett, Ark. plant of Crossett Paper Mills, the 36-in. Riffle-Grip belt was supplied by B. F. Goodrich Industrial Products Co. The traction "takes the slip out of a chip and increases production 20 per cent".

in the control of incoming materials, process control and quality control of finished goods. Samples of each roll of paper produced are delivered to the quality control station by pneumatic tube and are checked in a beta ray profiler to provide optimum control of basis weight across the web.

Two new Cameron Machine Co. slitters are in operation. Each is equipped with constant-tension devices that enable the firm to produce uniformly high-quality level-wound rolls. The units are designed to run at 1500 fpm and trim rolls ranging in width from 5½ to 100 in.

Patton Pope Reel

No. 3 paper machine (purchased from Lee Paper Co. at Vicksburg, Mich.) trims 100 in. A new Black-Clawson press section (the unit's third) has been added. Also installed was a Patton Mfg. Co. Inc. Pope reel and a completely new exhaust and ventilating system. The machine is balanced to operate at 600 fpm and produces approximately 15 daily tons of glassine and greaseproof grades.

The remodeling of No. 1 paper machine, which has a 119-in. wire width and trims 96 in., included the installation of a new Valley Iron Works headbox and a new Patton Pope reel.

No. 2 paper machine was equipped with a complete new wet end and press section supplied by Manchester Machine Co. and a new Pope reel. No. 2 has a wire width of 96 in. and trims 76 in.

New savealls were installed on both machines.

An entirely new stock preparation system—feeding all three paper machines—consists of four E. D. Jones & Sons Co. beaters, two Hi-Lo pulpers and an E. D. Jones high-speed refiner. Also installed were all-tile beater chests and machine chests.

St. Francisville Reports Instrumentation Contract

More than $500,000 is being contracted for the installation of a complete electronic/pneumatic instrumentation system at the new St. Francisville Paper Co. mill at St. Francisville, La. The equipment is to be supplied by Panellit Service Corp. The contract includes designing, engineering, manufacturing and start-up.

(*St. Francisville Paper is a joint project of Crown Zellerbach Corp. and Time Inc. and will produce coated magazine stock from southern hardwood and imported chemical pulp.*)

According to Panellit, the system will place the papermaking process under automatic control. In the installation—boasting more than 100 ft. of panels—are to be included annunciators, magnetic flow meters, recording and indicating electrical meters, pressure and temperature instruments, potentiometer pyrometers and gloss recorders. There is also a beta radiation system for weight and coating control.

The over-all instrumentation installation will control the steam plant, fourdrinier machine, supercalenders and finishes, stock preparation area, clay coating, the mix plant, screening and bleaching area and the grinders.

$40,000,000 Pulp Mill Set for Alberta

Plans for a $40,000,000 pulp mill in the Red Deer region of Canada's Alberta Province have been revealed by Alberta Pulp Mills Ltd. ("Financing", according to the company formed in 1949, "will be through public services.")

Cruisers and surveyors have been studying the area to outline a lease and provisional limits that will supply a mill of an approximate capacity of 450 daily tons. Timber resources already surveyed will allow for expansion to double the initial capacity.

Formica Flakeboard Plant

Formica Corp. has put into operation its new $5,500,000 flakeboard plant at Farmville, N. C. Annual capacity is 40,000,000 sq. ft.

Green pine timber—instead of the usual wood waste—will be used in manufacturing the particle board by this subsidiary of American Cyanamid Co. Formica developed the process through considerable research. The product will have a breaking point of 3500 psi as compared to 3000 psi for conventional flakeboard.

In addition to its use as a base for laminated plastics such as Formica, the flakeboard will be utilized in the manufacture of furniture, cabinet doors, flush door faces, sandwich panels and decorative paneling. It may also be used soon for sheathing in walls and sub-flooring.

Cuneo to Deink Paper

Cuneo Press Inc. will construct a plant in Chicago for the production of pulp from deinked waste paper. A pilot facility is now in operation.

The deinking plant as well as the pulp mill are expected to be on stream in 1960.

Superior Newsprint Produced as Herty Dedicates New Lab

On the heels of the recent dedication of a new laboratory in Savannah, Ga., the Herty Foundation in October reported the successful manufacture of newsprint from southern hardwoods.

Rolls of paper made from southern gum, cottonwood and willow were given a trail run by the *Savannah Evening Press*. And sponsors of the Georgia experiment called it "one in which profitable use can be made of hardwood trees that southern softwood foresters are now killing off wholesale . . . ".

The new Herty laboratory was dedicated early in October by Gov. Marvin Griffin. Recognizing the value of the research facility to the South's pulp and paper industry, the State of Georgia had made available $475,000 for its completion.

In discussing the successful newsprint run, Laboratory Director William Belvin disclosed that the ex-

Press-ready paper 90 minutes after first start-up! The third complete paper machine designed, manufactured and installed by Pusey and Jones for **Southland Paper Mills,** Lufkin, Texas, is now operating! This new, 270-inch wire-width machine started at 1550 feet of newsprint per minute and is ready to run at 2500.

It's another on-time start-up by:

THE PUSEY AND JONES CORPORATION

WILMINGTON 99, DELAWARE

EXPORT DIVISION: FRAZAR AND COMPANY, INC., 50 CHURCH STREET, NEW YORK 7

periment was on assignment from Noralyn Paper Mills Inc. of Baton Rouge, La. The hardwood was provided by the Baton Rouge firm, which has leased considerable Louisiana land with the aim of constructing a newsprint mill.

The Herty Foundation is continuing the work of the late Dr. Charles H. Herty, the chemist who made possible the use of Georgia pine in newsprint production.

St. Regis to Re-Open Carthage Mill; Will Expand Company-Wide

St. Regis Paper Co. planned to reopen its Carthage, N. Y. mill early in December. For some months the plant has been on a stand-by basis.

Production will consist of various kraft papers: shipping sack, variety bag, gumming and crepe. (The plant formerly turned out groundwood printing grades.)

Daily capacity is expected to average about 70 tons.

St. Regis to Add Capacity

As the general economy expands and new uses for paper are developed during the early 1960s, St. Regis will add annual capacity—particularly in the Northwest. This was the view expressed recently by William R. Adams, St. Regis president.

Adams said that by 1965 this expansion should provide the company with an annual sales volume of about $625,000,000 and a net of between $41,000,000 and $50,000,000.

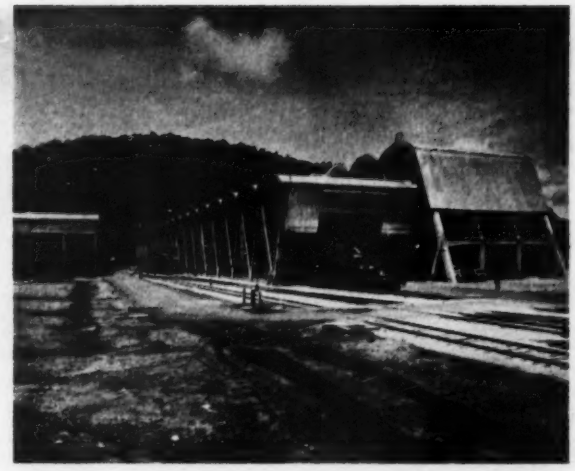
At the same time, St. Regis announced the merger of F. J. Kress Box Co. of Pittsburgh on the basis of 2¼ shares of St. Regis for each share of Kress.

Kress, a producer of corrugated and fiber shipping containers, operates plants at Pittsburgh; Newark, Ohio; Washington, Pa., and Hagerstown, Md. Total daily capacity of the Kress operations is 6,000,000 sq. ft.

$20,000,000 Program Announced by Gulf States

The third major expansion in the last decade has been reported by Gulf States Paper Corp. Included in the $20,000,000 project will be the mills at Tuscaloosa and Demopolis, Ala. The expenditure is to be devoted principally to new construction and to the modification of existing equipment.

The program will extend over the next three years and will be financed partially by a long-term loan from New York Life Insurance Co.



JUST ENTERING OPERATION at Tuxtepec, Mexico, is this unique $12,000,000 newsprint mill designed by Sandwell & Co. Ltd. of Vancouver, B.C. Operated by Fabricas de Papel Tuxtepec, the plant has an annual rated capacity of 30,000 metric tons. Shown is the main mill block containing the groundwood mill, chemical pulp slushing plant and the paper machine room.

Completion of the over-all plan will "make it possible for Gulf States Paper to utilize better the abundant supply of hardwood available to its manufacturing facilities".

Construction is to be continued at the new (1957) Demopolis plant so that production may include a wider variety of finished and semi-finished paper and pulp products. At Tuscaloosa the work will be aimed at the further improvement of products now being manufactured.

Owens-Illinois to Modernize Big Island

A major program to modernize one of the paper industry's pioneer mills has been announced by the Mill Div. of Owens-Illinois Glass Co.

At the Big Island, Va. pulp and paper mill a 170-in. high-speed paper machine will replace two 102-in. units.

The new machine will have an initial rated capacity of 265 tons per day and a potential future output of 380. (The old machines—which will be left in place for possible future emergency—had a combined daily capacity of 200 tons.)

New Size Press in Operation at Rex Paper

The conventional vertical size press has been replaced by a horizontal unit at Rex Paper Co. in Kalamazoo, Mich.

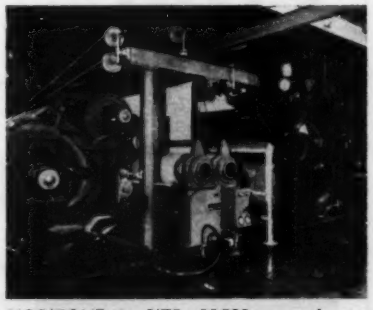
The press—supplied by Patton Mfg. Co. Inc. of Springfield, Ohio—aids Rex Paper in "improving the quality of its production. More even coating and starch distribution are reported. An improvement of solids distribution has been measured", and the mill has also "been able to appreciably eliminate two-sidedness".

The machine on which the press was installed trims 104 in. and turns out high-grade base coating book grades in a wide weight range. The machine was previously equipped with a conventional vertical size press.

The horizontal unit is entirely new and includes two 18-in. diameter 116-in. face rolls. Patton engineering made possible the new installation without necessitating changes in existing drive equipment. The size press rolls are straight (not crowned), "an unusual but quite satisfactory arrangement when compared to other horizontal installations." The hard roll is covered with Stowe-Woodward Inc. Microrok, while the soft swing roll is covered with S-W 20-30 P&J Plastometer rubber.

Rex Paper wraps the soft roll and feeds the sheet into the first bottom after-dryer, which is felted. Another unusual aspect of the installation is a rope carrier ring installed on the first after-dryer to drive the entire rope carrier system of the size press.

Currently the Kalamazoo firm is using the new size press only for conventional starch sizing applications. Starch size pick-up ranges between 3 and 5 lb. The starch is main-



HORIZONTAL SIZE PRESS recently installed at Rex Paper Co. was supplied by Patton Mfg. Co. Inc.

tained at between 150 and 160°F, and starch run-off is passed through a 90-mesh screen before it is returned to the supply tank.

Hurlbut Paper Completes $5,000,000 Paper Mill

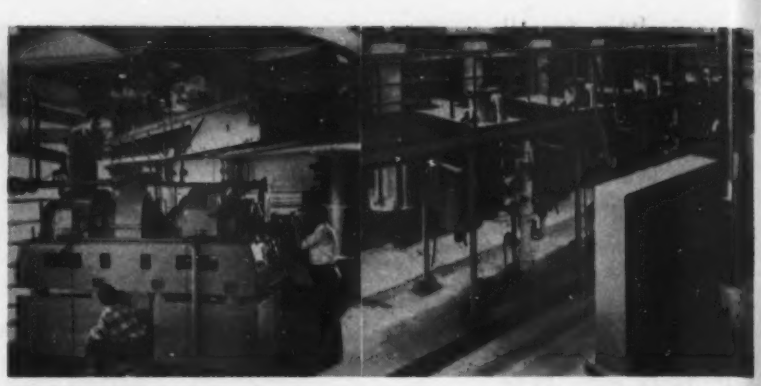
Western Massachusetts' first completely new paper mill in several decades has been put into operation at South Lee by Hurlbut Paper Co. The project—undertaken late in 1956—was completed at a cost of approximately $5,000,000.

The new Laurel mill, according to a spokesman for the company, is "part of an expansion program to handle the increasing demands during the last few years for the many technical papers Hurlbut manufactures. . . . It represents a 125-per cent capacity growth for the company".

The Massachusetts firm, a wholly owned subsidiary of Mead Corp., produces a wide range of special resin saturating grades, various types for air and liquid filtration and for chemical analysis and papers made of synthetic fibers of an organic and inorganic nature.

Powell River to Build Western Canada's First Fine Paper Mill

Western Canada's first fine paper mill will be constructed by Powell River Co. Ltd. Provided "firm prices for plant and equipment conform reasonably to estimates", construction is scheduled to begin late this year. Although no definite site has been announced, it is expected that the plant will be located in the greater Vancouver, B. C. region.



RECENTLY OPENED $2,250,000 plant of the Pulp & Paper Research Institute of Canada at Pointe Claire, Que., a suburb of Montreal, boasts a mill size Bauer Bros. double-disk refiner (1) and a chemical pulping laboratory with a bank of four pilot digesters. The facility, built and equipped by the Canadian government with the cooperation of the Canadian pulp and paper industry, is dedicated to finding "ways of producing a better product". Serving the entire range of papermaking from growing trees to the finished product, the laboratory design makes possible the unrestricted expansion of any major section without interference with any other.

It was revealed at the same time that Powell River will build a flakeboard plant near the present sawmill in New Westminster.

Cost of the two projects is expected to approximate $8,000,000.

Equipment is now being purchased for the flakeboard operation, which will boast a capacity of about 100,000 sq. ft. (Flakeboard is produced by bonding thin wafers of wood into board. The principal raw material will be British Columbia cedar, while the bonding will be accomplished by means of resins.)

World's Largest Pulp-Drying Plant for Bowaters Carolina

The world's largest pulp-drying plant in point of capacity has been shipped from Sweden for installation at the new Bowaters Carolina Corp. mill at Catawba, S. C.

The unit has a capacity of 400 tons of pulp per 24 hours and was built by Svenska Flaktfabriken of Sweden.

The Bowaters Carolina pulp plant is scheduled to enter production in April. It will be coordinated with the hardboard mill now under construction at Catawba by Bowater Board Co. The board plant will use only hardwood as raw material and is set for operation in 1960.

Allied News Notes . . .

Red-Ray Mfg. Co. Inc. has announced the appointment of A. N. Mason Co. of Yonkers, N. Y., as its representative in the metropolitan New York-New Jersey area.

Black-Clawson Co. has dedicated to the public domain the patented Sutherland process for producing high-yield high-strength kraft pulps by refining hot black liquor.

Monsanto Chemical Co. is establishing at its Seattle, Wash. plant production facilities for Mersize, fortified rosin size. The unit is set for operation early in 1959.

Calkin & Bayley Inc. has reported

STOP TELESCOPING ROLLS • MUSHROOMING CORES

Use HORTON Clutches and Brakes to control the sheet tension on your center winders and back stands. Take the guess work out of tensioning and let Horton equipment give you uniform good rolls all the time.

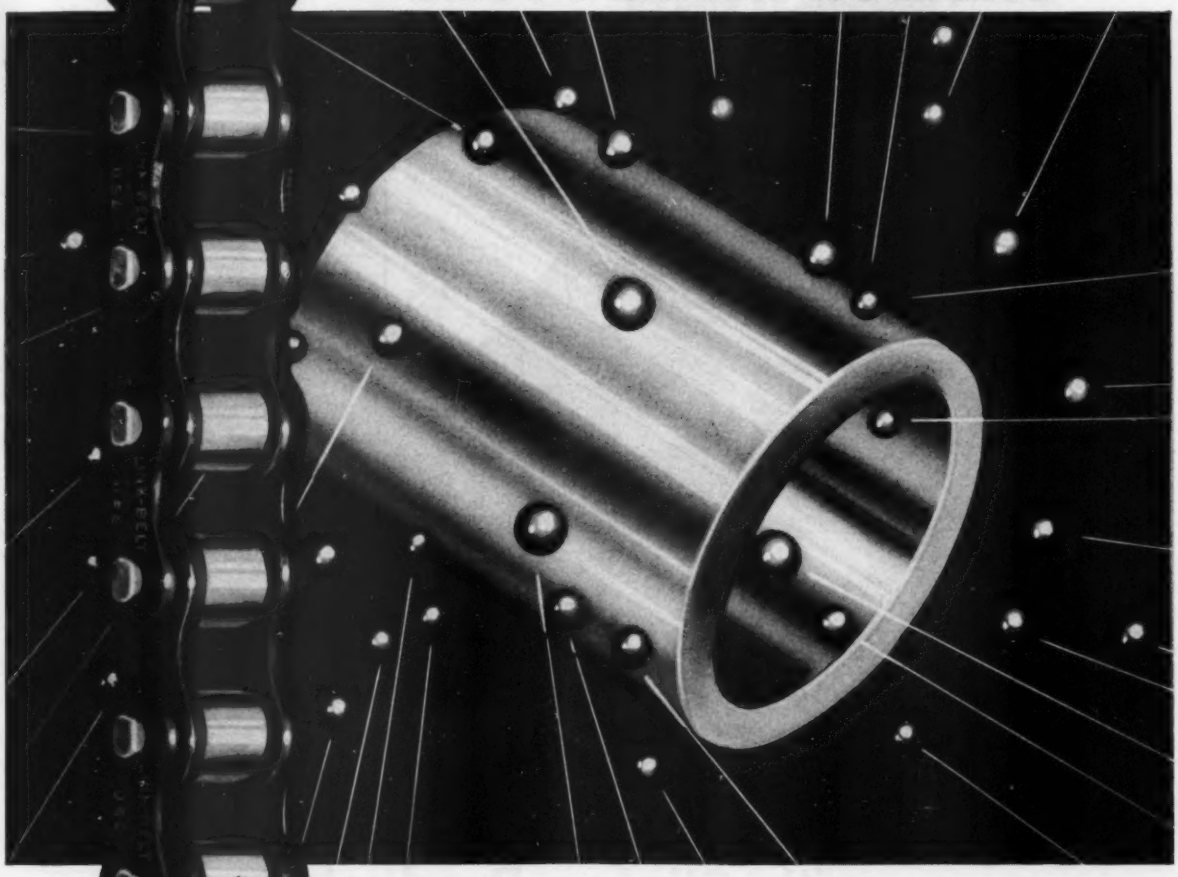
VARIABLE SPEED CLUTCH PULLEYS
GOVERNOR CONTROLLED BRAKES

HORTON MFG. CO., INC.
MINNEAPOLIS 14, MINNESOTA

Shining example of "extra" chain quality

SILVER-BRITE

SHOT-PEENED ROLLERS



EXTRA LIFE IS POUNDED IN AND NOT POLISHED OUT

Rollers for Link-Belt precision steel roller chain are now finished by a special burnishing process to a "Silver-Brite" luster! And this is accomplished *without grinding away the benefits imparted by shot-peening*—a Link-Belt process that cold works the metal and provides extra fatigue life.

Many more special Link-Belt "extras" contribute to the dynamic strength so important for today's heavy loads and high speeds: close heat-treat control . . . lock-type bushings . . . pitch hole preparation . . . pre-stressing.

Ask your Link-Belt office or authorized stock-carrying distributor for new 154-page Catalog 2657—the most complete roller chain data book ever compiled.

LINK-BELT

ROLLER CHAINS & SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 14,976

In every test . . .

your paper finish meets specifications exactly

with Clinton Products

For your paper finish, you can be sure of highest strength, efficient coating and desired penetration with Clinton products from corn. These ingredients—starches and dextrins—produce the same results every time, because:

CONSISTENT FORMULATION MAKES CLINTON PRODUCTS RELIABLE

Three analytical control laboratories and several single-purpose testing stations are located at strategic points in our plant. They check every stage in the processing of *all* products . . . they check *all* finished products to be sure specifications are met exactly. That's why you can depend on Clinton products to do the job for which they are needed.

Your Clinton salesman can help you select the right products to make the finish you want. And, should you need special production advice, *prompt* technical service is available when you need it. Call your Clinton salesman today, or write:

CLINTON CORN PROCESSING COMPANY
CLINTON, IOWA

CLINTON ...*Where research today improves tomorrow's product*

the acquisition of the services and personnel of H. Rimberg & Associates, a New York, N. Y. consulting firm specializing in finishing room problems.

Union Associates Inc., a new Fitchburg, Mass. firm, has announced the purchase of **Union Machine Co.** and **Union Screen Plate Co.**, both of Fitchburg. Union Machine was founded in 1868 and manufactures papermaking machinery, while Union Screen Plate was established in 1902 to continue the production of screen plates for the paper industry undertaken some years before by Union Machine.

Yarnall-Waring Co., Philadelphia manufacturer of steam plant equipment, has recently celebrated its 50th year of operation. At an open house held in conjunction with the event more than 400 customers, suppliers, distributors and "neighbors" toured the Chestnut Hill plant.

Archer-Daniels-Midland Co. of Minneapolis has announced that its industrial cereals department is handling the marketing of bentonite to the paper industry. (Bentonite is a clay with absorption and adhesive qualities that make it "ideal for pulp refining, by-product recovery and papermaking applications".)

Coming Events

Tappi

January 13—Lake States Section, Appleton, Wis.

January 20—Pacific Section, Aberdeen, Wash.

February 23-26—National Meeting, Hotel Commodore, New York, N. Y.

Superintendents Association

January 15—Michigan Division, Hotel Harris, Kalamazoo, Mich.

January 27—Miami Valley Division, Hotel Manchester, Middletown, Ohio.

February 12—Michigan Division, Hotel Harris, Kalamazoo, Mich.

Other meetings

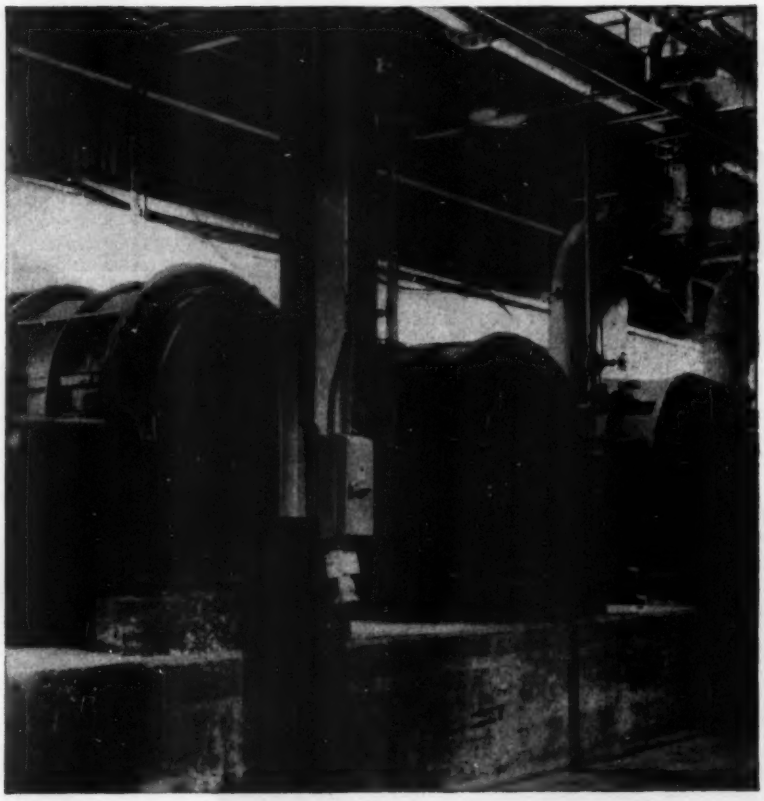
January 14-15—Third Annual Pulp & Paper Conference, Western Michigan University, Kalamazoo, Mich.

January 26-29—Plant Maintenance & Engineering Show, Public Auditorium, Cleveland.

January 26-February 5—Annual Short Course in Quality Control by Statistical Methods, College of Engineering, University of Illinois, Urbana, Ill.

January 28-30—Technical Section, Canadian Pulp & Paper Association, Annual Meeting, Hotel Queen Elizabeth, Montreal, P. Q.

What, actually, do Vacuum Pumps on paper machines handle?



Paper mill engineers know that it is actually a mixture of air and water vapor, but the custom of rating vacuum pumps in terms of air capacity alone causes this important fact to be frequently overlooked.

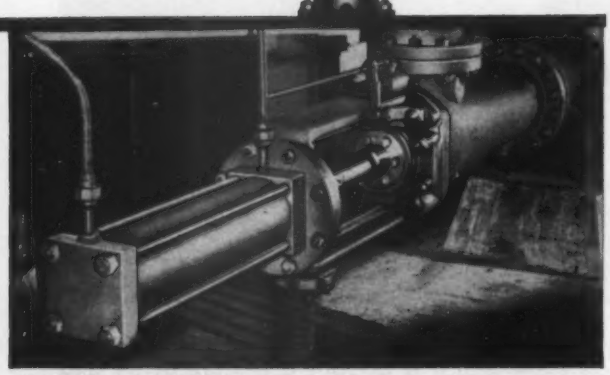
The presence of this water vapor causes a considerable reduction of the effective air handling capacity of any vacuum pump except the Nash. In the Nash Vacuum Pump the bulk of this water vapor is effectively condensed, due to the Nash operating principle. The air handling capacity of the Nash is therefore not reduced.

That is one of the reasons why Nash Vacuum Pumps are standard in over a thousand leading Paper Mills.

NASH ENGINEERING COMPANY

443 WILSON ROAD, SO. NORWALK, CONN.

full, free digester discharge



HYDRAULIC-OPERATED Yarway Digester Blow Valve—one of six installed at large North Carolina paper mill.

MOTOR-OPERATED Yarway Digester Blow Valve—one of eight installed

Digesters blow fast and clean with YARWAY Seatless Blow Valves.

The hollow sliding plunger has no pockets where wood chips or tramp materials can hang up.

All Yarway Digester Valves have full pipe area, permitting fast discharge with minimum pressure drop. Comparisons show greater discharge area—reducing blowing time, increasing number of cooks.

Scores of pulp mills report *lower operating costs* and *increased production* due to YARWAY Digester Blow Valves. One large mill found *savings in operation and maintenance the first year more than paid the cost of their 4 new Digester Valves!*

YARWAY Seatless Digester Valves can be furnished either with electric motor or hydraulic cylinder units. Both are remote controlled. Bulletin B-441 gives the whole story. Write for it.

YARNALL-WARING COMPANY

149 Mermaid Avenue, Philadelphia 19, Pa.

BRANCH OFFICES IN PRINCIPAL CITIES

· DIGESTER BLOW VALVES

NAMES *in the* NEWS

Earl S. Moak

John Fulkerson

Marthon Southern Names Moak Superintendent

Marathon Southern Corp. (a division of American Can Co.) has appointed Earl S. Moak paper mill superintendent to succeed the late Robert S. Williams.

Succeeding Moak as assistant paper mill superintendent is John R. Fulkerson.

The new Marathon Southern plant at Naheola, Ala., is now in its initial production.

Moak was formerly associated with the Hollingsworth & Whitney Div. of Scott Paper Co. in Mobile, Ala. He began his papermaking career at the age of 14 and for a number of years was associated with Union Bag & Paper Corp.

Fulkerson was formerly on the Research and Development Div. staff of Marathon in Menasha, Wis., and was at one time assigned to process engineering at the mill in Rothschild. Prior to his association with the industry he was on the staff of American Cyanamid Co.

Whitney Named VP at Institute

The board of trustees of the Institute of Paper Chemistry at Appleton, Wis., has elected Dr. Roy P. Whitney as an additional vice president. The new position was created "in recognition of the growth of the Institute and the importance of its academic program".

Dr. Whitney, a graduate of the Massachusetts Institute of Technology, joined the Institute in 1947 as head of the chemical engineering group. He became dean in 1956 and will continue to hold that office.

Diamond Gardner Promotes Siegel

Diamond Gardner Corp. has promoted Richard L. Siegel to president of its Gardner Div. of Middletown, Ohio. Becoming chairman is Colin Gardner, who formerly held the presidency.

Siegel joined Gardner in 1949 as director of industrial and public relations, became a vice president in 1954 and later was appointed assistant to the vice president and general manager. He became vice president and general manager of the Gardner Div. in 1957.

Prior to joining Gardner in 1949, Siegel was associated with International Harvester Co.

R. L. Siegel

John Lazar

Rhinelander Promotes Lazar

Rhinelander Paper Co. at Rhinelander, Wis., has announced the promotion of John Lazar to the position of production manager. He is responsible for the pulping, papermaking and converting production facilities as well as the materials handling operations.

A graduate of Northwestern University, Lazar joined Ripco in 1953 following three years with Scott Paper Co. and one year each with Pabst Brewing Co. and Boeing Aircraft Corp. Prior to his present Rhinelander appointment he was assistant to the vice president for operations.

In another Rhinelander personnel change John Bunn Jr. has been named to the newly created position of training director in the department of industrial relations. He was formerly on the staff of the plant management training department of the General Motors Institute.

Bunn will organize and direct training programs for supervisors, foremen and operating personnel throughout all operating departments and will also aid in the betterment of the Ripco safety program.

Owens-Illinois Promotions

Promotions of three engineers in the Mill Div. of Owens-Illinois Glass Co. have been announced by the Toledo, Ohio headquarters:

Frederic A. Adams, for the past year division engineer at Toledo, becomes assistant plant manager at the Valdosta, Ga. pulp and paper mill. Prior to his present appointment, he was Valdosta electrical engineer from 1953 to 1957.

Glenn Ralston, formerly assigned to the Mill Div.'s central laboratory, has been named division engineer and will report to Fred B. Schelhorn, vice president for manufacturing at Toledo. He was at one time general superintendent and project engineer at Valdosta.

George R. Zaloudek, plant engineer at Valdosta, moves to Toledo as project engineer. He joined the firm in 1955 as assistant plant engineer at Valdosta and became plant engineer in 1956.

F. A. Adams

J. E. Davis

John E. Davis of Bristol, R. I., has been appointed chief industrial engineer for Brown Co. of Berlin, N. H. He was formerly assistant manager and head of the industrial engineering department for Cobar Industries Inc.

(Turn to page 622)

Names in the News . . .

Harold J. Lausman has been named assistant manager of the Appleton Div. of Consolidated Water Power & Paper Co. He has been associated with the firm since 1939 and most recently was a pulp and by-products sales representative.

H. J. Lausman

Hewitt Walsh

Hewitt Walsh has been named vice president of Clupak Inc. He recently joined the firm as technical director and will continue in that position. He was previously in charge of special projects for West Virginia Pulp & Paper Co., which—together with Cluett, Peabody & Co.—owns Clupak.

Robert F. Mackrell, nationally-known transportation authority, has retired as director of transportation for National Gypsum Co. He joined the firm in 1926 at its Clarence Center, N. Y. plant and established a one-man transportation department; (National Gypsum was organized in 1925). Today the company's 40-man transportation staff controls the traffic in and out of 38 plants.

Edward F. Boyle, formerly superintendent of Rocky River Paper Mills Inc. in Three Rivers, Mich., has been named superintendent of the Denver, Colo. paperboard plant of Central Fibre Products Co.

Dr. Harry F. Lewis, vice president and dean emeritus of the Institute of Paper Chemistry at Appleton, Wis., has been named by the American Chemical Society as the 1959 winner of the Scientific Apparatus Makers' Award in the field of chemical education. The $1,000 prize will be presented to Dr. Lewis at the April meeting of the society in Boston.

J. B. Fagot has been named director of management development for Fibreboard Paper Products Corp. at San Francisco. In the position he will "establish a program of management development methods and will institute management procedures for recruiting, placement, guidance, counseling, appraisal and promotion". Fagot was formerly vice president in charge of personnel and industrial relations for Omar Inc. of Omaha, Neb.

P. S. Quinn has been named manager of manufacturing for Anglo-Canadian Pulp & Paper Mills Ltd. and for its subsidiary, Dryden Co. Ltd. He was formerly mill manager for Anglo-Canadian at Quebec, P. Q.

James J. Sommers has been named plant manager of Container Corp. of America's corrugated shipping container operation in Cleveland. He joined the firm in 1950 as an internal auditor and following several promotions was made controller at the Andersdon, Ind. plant in 1956.

Dr. Sherwood G. Holt, formerly chief engineer in charge of papermaking research for Scott Paper Co., has joined the staff of Consolidated Water Power & Paper Co. in Wisconsin Rapids, Wis., as manager of the development department.

Warren A. Chilson, a research production specialist in the paper industry, has joined the staff of the United States Forest Products Laboratory in Madison, Wis. Well known for many years in the industry, his most recent position was that of production manager for Chemical Paper Mfg. Corp. in Holyoke, Mass.

Richard B. Miller has been appointed corporate staff personnel manager for Scott Paper Co. He joined the firm in 1950 as a consumers representative in production at Chester, Pa. Since 1956 Miller has served as manager of corporate employment and college relations.

George Rumberger has been named manager of fundamental research for Sutherland Paper Co. at Kalamazoo, Mich. He succeeds the late Dr. Leslie G. Joyner. Rumberger is a member of the American Chemical Society, the American Assocation for Testing Materials and Tappi.

Chester F. O'Brien has retired as superintendent of J. P. Lewis Co. in Beaver Falls, N. Y. His retirement follows 45 years of continuous service with the firm.

Allied Personalities

William M. Freeman, since 1951 a member of the New York sales department, has been named manager of Chicago Bridge & Iron Co.'s equipment sales group. Associated with the firm 17 years, Freeman will maintain headquarters in New York, N. Y.

Emerson N. Glauner Jr., with wide experience in the pulp and paper industry as well as in the field of papermaking machinery (particularly cylinder board units), has joined the sales department of Be-

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loit Iron Works. He will headquarter in Beloit, Wis. . . . At the same time it was announced that **P. J. (Pete) Jerardi** has joined the BIW staff. He has had extensive experience in papermaking machinery manufacture and will be located at Hamilton, Ohio.

John E. Wilbur and **Rupert H. Austin Jr.** have been named field service engineers for Huyck Felt Co. Wilbur, who will cover the Middle Atlantic states, was formerly a sales engineer in the Middle West. Austin (whose territory will include Vermont, parts of Massachusetts, New Hampshire and New York) was formerly on the staff of Strathmore Paper Co. as a technical salesman.

Keith J. Evans has retired after 46 years' service with Joseph T. Ryerson & Son Inc. His latest position was that of marketing and public relations consultant. He had previously been director of marketing and public relations.

N. Stanley Snyder, district manager at the Buffalo office, has retired after 52 years of service with Link-Belt Co. He joined the firm as a clerk in the Philadelphia plant and in 1924 was named district manager at Buffalo. Succeeding him at Buffalo is **R. F. Betts,** former Boston district sales engineer.

Penick & Ford Ltd. Inc. has announced that **Dr. Raymond I. Bashford Jr.** has joined the eastern technical sales service and field development staff. He was previously associated with E. I. duPont de Nemours & Co. Inc. . . . Also reported by Penick & Ford was the appointment of **Frank Ware** as sales representative in the Michigan-Wisconsin area. He was formerly a sales representative for the Chemurgy Div. of Glidden Co.

Herbert L. Pehrson has been named general sales manager for the Pacific Div. of Ladish Co. He was formerly manager of West Coast sales.

Arthur J. Sternby, a Shartle Div. sales engineer, has completed an extensive Black-Clawson Co. sales training course and has been assigned to sales and promotion of stock preparation equipment in Indiana and Illinois (except the Chicago metropolitan area). . . . Having worked for Black-Clawson dur-

(Continued on page 644)

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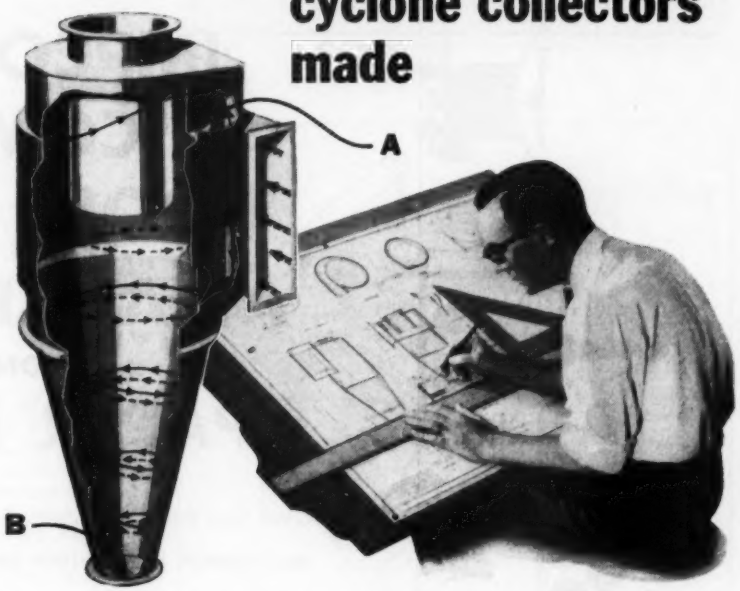

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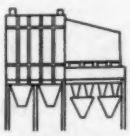
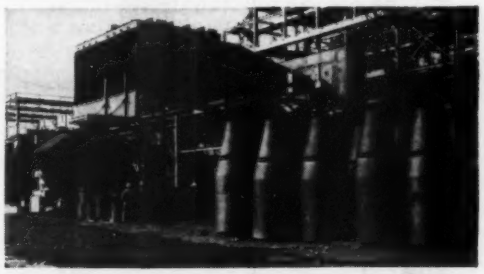

PRECIPITATOR-CYCLONE COMBINATIONS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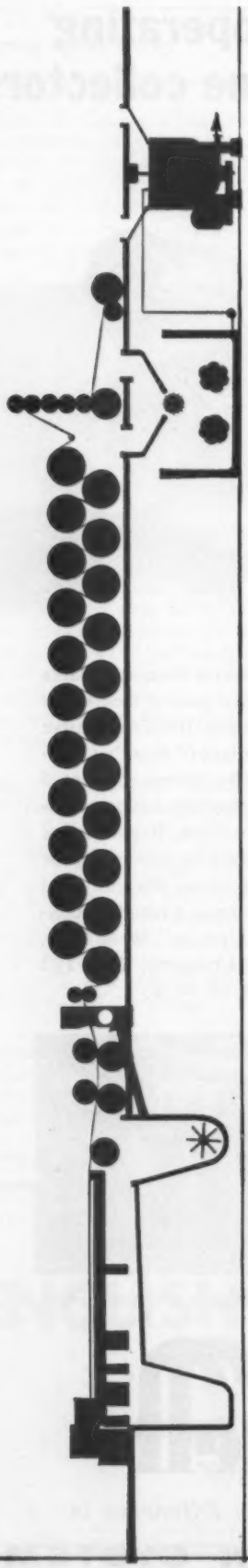

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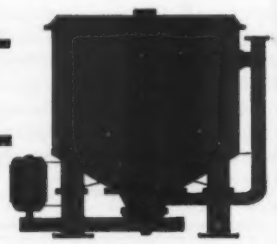

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PATENT REVIEWS

MELVIN NORD*

Control of odor in the preparation of wood pulp

U. S. 2,839,399, issued June 17, 1958, to William M. Gearhart and John B. Thompson and assigned to Eastman Kodak Co., describes a process for diminishing odor in the manufacture of kraft pulp. This is done by the use of aniline or secondary butyl aniline, alone or mixed with N, N'-di-secondary butyl-p-phenylenediamine with or without added peroxide material.

Elimination of odors in kraft pulp mill operation

U.S. 2,830,869 and 2,830,870, issued April 15, 1958, to Jack McK. Limerick, provide methods of eliminating obnoxious sulfurous odors in kraft pulp mill operation.

The present invention contemplates feeding ozone into the stack gases coming from the black liquor furnace and also the supplying of ozone to the gases vented in the digester, blowdown, evaporators, etc. It has been found that ozone, added to such gases, has an inexplicable deodorizing effect and eliminates the objectionable odors, even though the quantity of ozone added is far less than enough to meet the theoretical oxidation requirements of the available H_2S and mercaptans. Sampling of the gases at the point of discharge has revealed the presence of unreacted H_2S, on occasion, unreacted mercaptans and free ozone, and such samples have been taken while the mill was operating in a virtually odorless condition.

At the present cost of ozone generation, it would be uneconomic to supply the theoretical requirement for complete reaction, let alone the excess that would be needed to insure complete reaction. It has been found that if ozone is delivered to the discharging gases in a proportion between 10 and 100 parts per million the characteristic kraft mill odors may be avoided.

It is essential that the ozone be retained for a certain length of time in order to get the maximum effect. In the case in which 30 parts per million were supplied, the minimum retention time for effective elimination of odor was found to be about 2.2 sec.

Relief and blowdown gases present a somewhat different problem than do the stack gases from the black liquor furnace. In these gases mercaptans rather than H_2S are the offenders. Most of the mercaptans evolved go to the vents receiving digester relief, blowdown gases and evaporator relief. The mercaptans are formed in the liquor as a sodium salt due to some obscure reaction between the hydrolized sodium sulfide and some constitutents of the wood. The sodium mercaptide, however, reacts with the water to release methyl mercaptan as a gas.

In most modern kraft mill practice relief gases of the type above noted are passed through a condenser system. In deodorizing such gases, ozone should be added both before and after the condenser if the condenser is of the surface type. Water itself has a considerable affinity for ozone, and if ozone consumption is to be held at economic levels, addition of the ozone must be deferred until after the gases have been subjected to the action of any scrubbers or jet-type condensers that may be used in the treatment of the gases. The ozone added ahead of the condenser has the effect, in part at least, of oxidizing the methyl mercaptan to dimethyl disulfide, which not only is less foul smelling but has a much higher boiling point, which means it may be readily condensed from the vapors. Following the condenser, there should be a further addition of ozone, not particularly to react chemically but to produce a deodorant effect.

Method of processing raw wood

U.S. 2,835,292, issued May 20, 1958, to Julius F. T. Berliner, relates to a method of processing raw woods of shrubs such as those found in desert regions (e.g. the creosote bush) for use in the production of hardboard and for the recovery of by-products from the wood.

As shown in Fig. 1, from the stockpile 10 the wood pieces are carried on a conveyor 12 and fed into a hopper 13, which is the entrance to a debarking machine. From an outlet opening 15 of the

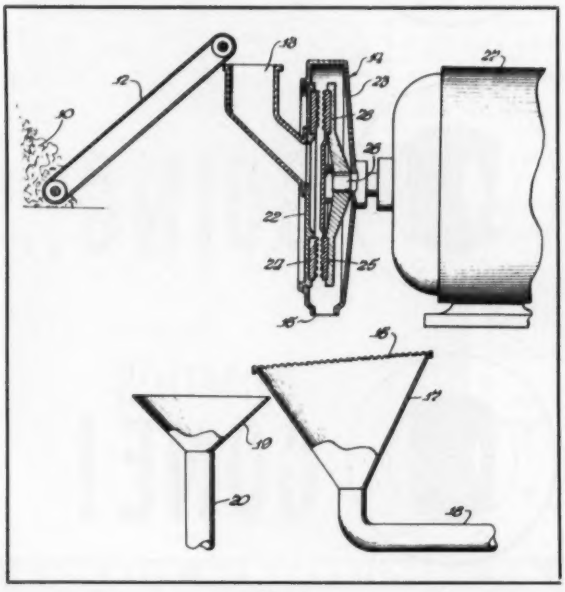

Fig. 1

debarking machine the pieces of wood from which the bark has been removed and the finely-divided particles of bark are discharged onto a screen 16 for separation of the bark particles from the wood pieces. The bark particles pass through the screen and into a hopper 17, from which they are discharged through a conduit 18. The wood pieces pass from the screen 16 into a hopper 19 and are conveyed to a digester or place of treatment through a conduit 20.

A disk-type mill 22 is used for effecting the removal of a large proportion of the bark from the wood pieces without appreciable loss of wood. No washing or water separation is required.

Apparatus for applying dry steam to a pulp mat to evaporate water

U. S. 2,838,982, issued June 17, 1958, to Joseph H. Dupasquier, is based on the principle that the withdrawal of moisture from the pulp mat while the mat is still on the fourdrinier wire can be considerably increased by the application of heat to the mat. Such early application of heat also increases the extent to which the mat and the resulting paper web will lose moisture during the subsequent period of travel through the press sections.

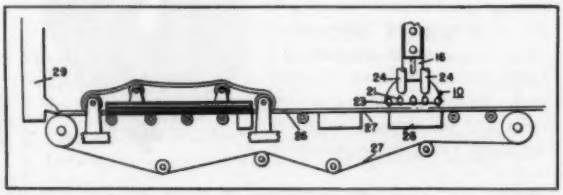

Fig. 2

In Fig. 2 the pulp mat (indicated at 26) is formed in the usual manner by the delivery of pulp from flow box 29 upon the moving fourdrinier wire 27. As the pulp mat is moved along with the wire it passes over suction boxes, one of these being in-

*Patent attorney, 17600 Pinehurst, Detroit 21.

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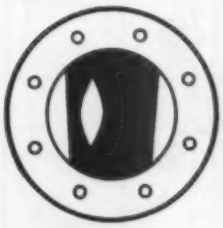

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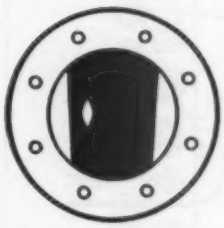

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Patent Reviews . . .

dicated at 28, which aid in the draining of withdrawal of water from the pulp down through the wire. The device by which dry steam is applied to the pulp mat in the carrying out of the present invention is indicated in general by the reference character 10 and consists of a steam chest or chamber extending across the pulp mat and fourdrinier wire. It is spaced a slight distance above the mat, supplied with steam from a suitable source and has orifices through which jets of dry steam are delivered down onto the pulp for the purpose of heating the pulp.

Absorbent paper

U.S. 2,834,809, issued May 13, 1958, to Richard W. Schutte, Kenneth W. Britt and Albert McConnell and assigned to Scott Paper Co., discloses a method of producing absorbent paper for use as industrial wipers.

The present invention provides a clean, economical and safe disposable industrial wiper having high affinity for oil and grease. The wiper is strong in both machine direction and cross-machine

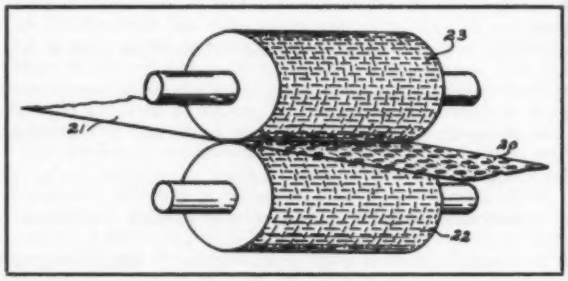

Fig. 3

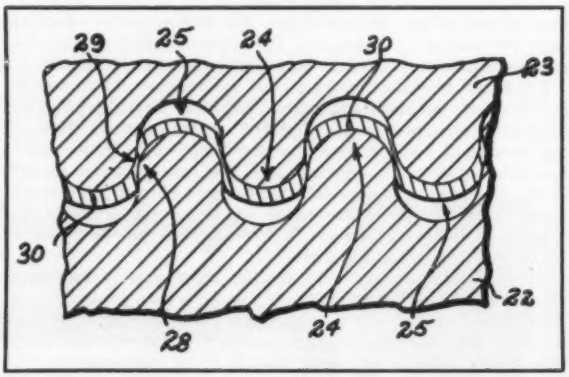

Fig. 4

direction and has sufficient caliper or bulk to provide a thick sheet so that the person using a single sheet of the product is satisfied with its "feel" and is not tempted to use several sheets for a single cleaning operation when a single sheet would suffice.

Fig. 3 shows a pair of forming rolls used to produce the sheet of absorbent paper. Fig. 4 is an enlarged sectional view of the rolls.

Modified mechano-chemical pulping

U. S. 2,835,574, issued May 20, 1958, to Samuel I. Aronovsky and Elbert C. Lathrop and assigned to Secretary of Agriculture, describes a mechano-chemical process for pulping non-woody cellulosic fiber materials into pulp products.

The process involves three stages. The first stage is a combined mild chemical and intense mechanical pulping. The second stage is a chemical digestion without mechanical action. The third stage is a brief period of intense mechanical agitation.

The invention is said to result in a substantial power saving.

Other Patents of Interest to the Pulp and Paper Industry

Subject	Inventor or Assignee	Patent No.	Date
Paper tube concrete form	Sonoco Products Co.	2,836,876	6/2/58
Device for applying covers to paper cups	Sutherland Paper Co.	2,836,948	"
Scoring apparatus	St. Regis Paper Co.	2,837,012	"
Folding box machine	Baljak Corp.	2,837,013-4	"
Self-locking folding boxes	Baljak Corp.	2,837,261	"
Package holder for cans	Sutherland Paper Co.	2,837,262	"
Two-piece carton with neck	Federal Carton Corp.	2,837,264	"
Bags	Potdevin Machine Co.	2,837,267-8	"
Paper winding machine	Rice Barton Corp.	2,837,293	"
Paper size	Sinclair Refining Co.	2,837,439	"
Collapsible shelter	Lawrence Paper Co.	2,837,777	6/10/58
Rotary refiner	Black-Clawson Co.	2,837,977	"
Pulpwood chipper feeds	Canadian Forest Products Ltd.	2,838,080	"
Molded pulp packing device for fragile articles	Keyes Fibre Co.	2,838,173	"
Container with integral suction tube	Jess Oppenheimer	2,838,220	"
Basket	St. Joe Paper Co.	2,838,221	"
Folding box construction	Constantine J. Papadopoulos	2,838,222	"
Foldable can carrier	Container Corp. of America	2,838,223	"
Handled paper bag	Interstate Bag Co.	2,838,224	"
Supplemental sleeve for multiwall gusseted valve bag	Arkell & Smiths	2,838,225	"
Molded pulp casing for bottles	Keyes Fibre Co.	2,838,226	"
Rechipper	Sumner Iron Works	2,838,248	"
Drying of impregnated porous webs	Kimberly-Clark Corp.	2,838,420	"
Log barking apparatus	Northern Wood Barking Mfg. Co.	2,839,106	6/17/58
Container with pouring spout	Weinon Corp.	2,839,122	"
Blank for can holder	Container Corp of America	2,839,234	"
		2,839,235	"
Carton lock	Waldorf Paper Products Co.	2,839,236	"
Waxed paper holder	Waldorf Paper Products Co.	2 839,255	"
Apparatus for impregnating multi-layer paper insulation	Carl G. Munters	2,839,838	6/24/58

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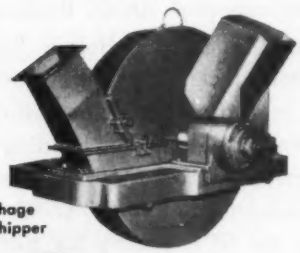

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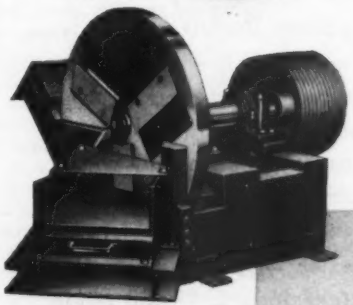
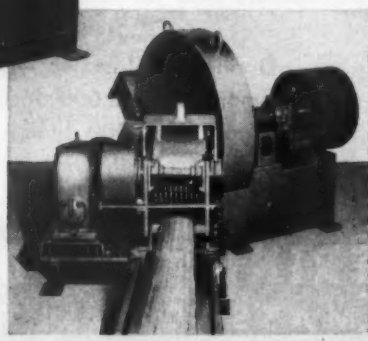


Carthage 39" Chipper Horizontal Feed



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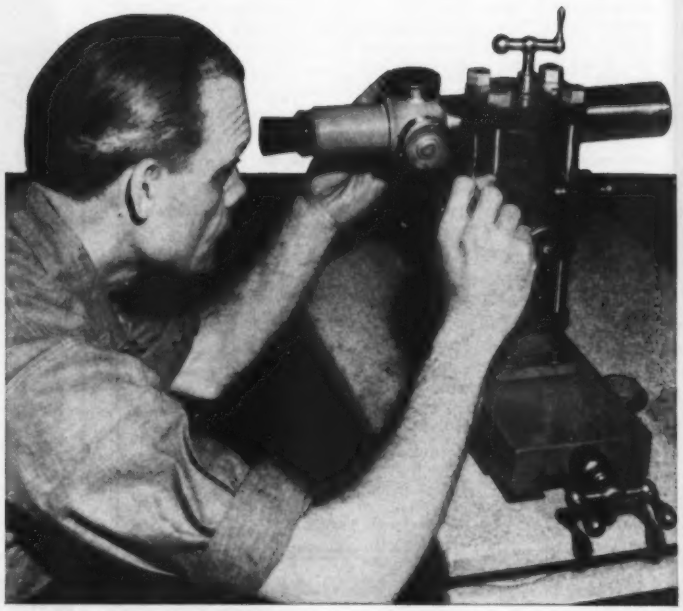

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FOREIGN ABSTRACTS

Results of grinding submerged and unsubmerged sprucewood

Mechanical pulping was carried out separately with the submerged and the unsubmerged portions of spruce logs taken from rafts that had been in the water for five months during the summer and autumn. The submerged parts contained an average of 68 per cent water. The unsubmerged portions held about 38 per cent water. In all cases, the resulting groundwood was evaluated by the methods used in the Norwegian Pulp and Paper Research Institute, and the data were treated statistically by a linear regression procedure in which the degree Schopper-Riegler was considered an independent variable.

The pulp made from the submerged parts had a significantly higher content of long fibers, better strength properties and greater brightness than those manifested by the pulp made from the unsubmerged portions. These differences were quite marked. The pulp from the non-submerged portion gave more fines than did the other. The specific power consumption for making groundwood (of the same degree Schopper-Riegler) was approximately the same in either case. If however a mechanical pulp of the same strength was to be produced, the drier wood required much more power than did that holding the more water.

Twelve figures, six tables and 11 references are given. Jon Brandal and Knut Johannessen. *Norsk Skogind.* **12**, 262-71 (1958) (in Norwegian with English summary).

Mechanical treatment during the cook; effects on pulp properties

Pulp prepared in Kamyr's continuous digester had been shown previously to have a somewhat lower strength than had ordinary commercial kraft pulps, nor could it be beaten as easily.

The present study attempts to find causes for these differences. Tests were made in an electrically-heated autoclave provided with a propeller. Kraft undefibrated pulp was treated mechanically for various time periods and with varying amounts of residual alkali in the black liquor. The temperatures during this treatment varied from 110-170° C, and the pH range was 12.5-13.4. Even after a few minutes of such mechanical treatment at 170° C. in normal black liquor, the pulp underwent marked deterioration. Burst, tear strength and beatability all decreased rapidly, finally reaching stable values about 10-15 per cent below normal. When a lower temperature was used, this deterioration was largely avoided, and by decreasing the temperature (at mechanical treatment) to 150°, the pulp properties were much less affected than at the higher temperature. The black liquor pH also proved to be important. Increases in the amount of alkali in the black liquor caused more rapid (than the customary) decrease in pulp strength, but it had little effect on the rate of beating. As long as the pulp fibers were not defibrated in the cooked chips, no pulp deterioration occurred. Evidently the fibers are protected prior to mechanical treatment.

After defibration the individual fibers were subjected to the chemical attack of the alkali, hemicelluloses were removed and the rate of hydration decreased. The decrease in pulp strength properties seems to depend mainly on the mechanical damage suffered by the fibers. Fig. 1 shows the burst factor plotted against temperature, at which a 15-min. mechanical treatment was given. It also shows the effect of varying the pH of the liquor. Fig. 2 shows the tear factor at 30° Schopper-Riegler, plotted against the temperature at which 15 min. of mechanical treatment was given at the various pH levels.

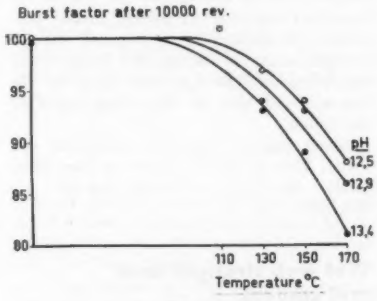


Fig. 1

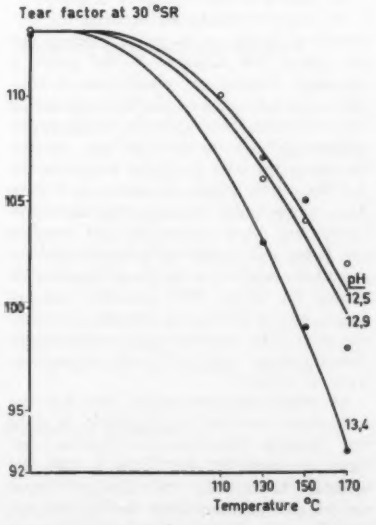


Fig. 2

Three references and eight figures. Tore Knuttson and Lennart Stockman, *Svensk Papperstidn* 61,424-430 (1958) (in Swedish with English and German summaries. Captions are in English).

Biological method for showing storage qualities of groundwood

Much moist mechanical pulp is now treated with organic mercurials so as to prevent fungal infection. Well-established chemical methods are used in determining mercury even in microgram amounts in such (stored) treated pulps. However, unlike biological assays, these chemical techniques do not show whether the fungicide is present in a "biologically active" state. This is an important distinction, because only bioactive mercurial preservatives are capable of preventing the growth of microorganisms. Thus, mercurial fungicides can be present in full measure in moist groundwood but remain completely inactive and thus afford no prevention of fungal growth. In such cases chemical analyses *per se* give no information regarding the present or future potency of the mercurial compound.

The author describes in some detail a biological method for forecasting the approximate storage life of moist groundwood when treated with mercury compounds. He believes that mercurial fungicides may be deactivated: (a) by chemical combination with lignin, etc.; (b) by interaction with susceptible organisms in the pulp, and (c) by conversion into some inert organo-mercurial compounds by means of resistant micro-organisms (by a mechanism that has not been explained as yet). After partial deactivation, some of the fungicide is still biologically active and may be available to the pulp in preventing infection. Even this activity decreases with time, and the concentration of biologically active material is usually much higher in freshly-produced treated pulp than in this same pulp six months after treatment. In such cases the chemical analyses may show no noteworthy differences and are of questionable value.

An extensive study made in the laboratories of Bowater Research Development Co. Ltd., Nothfleet, Kent, England, shows that the bio-assays can be closely correlated with the age and microbial condition of the mechanical pulp under investigation. The production of "spurious inhibition zones" in what were obviously infected pulps may be due to the secretion of antibiotic substances elaborated by certain naturally occurring microorganisms in the pulp.

The methods for carrying out the biochemical assays, the treatment of experi-

mental data and their interpretation are given in detail in a specific example, in which the full calculation of the regression equations are included.

Fourteen references, four tables and four figures are given. P. Russell. *Svensk Papperstidn.* 61, 493-500 (1958) (in English).

Corrosion of steel in alkaline pulping liquors

In a previous study by the present author [*Suomen Kemistilehti* (Finland) B 29, 163 (1956)], it was shown that when steel is immersed in an alkaline monosulfide solution it becomes increasingly negatively charged. The metal thus becomes more active and begins to corrode.

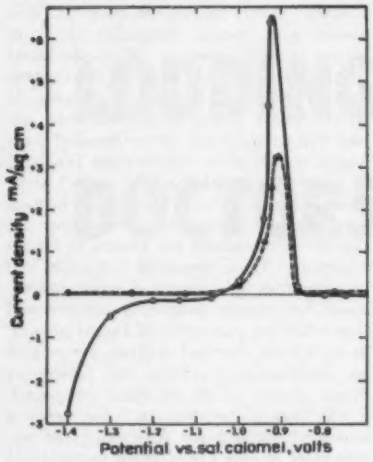


Fig. 3

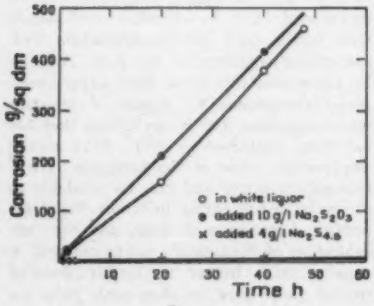


Fig. 4

In the beginning of a cook any rise in temperature promotes this corrosion. The development of this "active" state is inhibited, and the steel is transformed from the active to passive state when polysulfides (notably $Na_2S_{4.5}$) are added to the alkaline solution.

In the present investigation a study was made of the liquor components that promote marked corrosion in kraft cooking liquors. Attempts were made to determine conditions under which corrosion could be reduced to a minimum. Small amounts of polysulfides actually promoted corrosion, but the addition of larger amounts accelerated the transformation of the steel to a passive state and thus arrested corrosion. The polarization curves (Fig. 3) and the variation of corrosion with varying time and potential were drawn in the case of cooking liquors varying in concentration and in composition, both at room temperature and at their boiling points. Fig. 3 shows the polarization curve (solid line) and the corrosion potential curve (broken line) of steel in white liquor at 25° C. It was shown that liquors that contain 100g of caustic soda and 35g of sodium hydrogen sulfide per liter (concentrations that are quite common in pulping liquors) were high enough to insure marked digester corrosion under certain conditions. Such corrosion could be prevented effectively by a slight reduction of the caustic soda content at the beginning of the digestion, and corrosion (as indicated above) could be prevented almost completely by the addition of polysulfides to the liquor in amounts that varied depending on the cooking conditions. The required amounts could be determined experimentally by making potential measurements early in the cook.

Fig. 4 shows the corrosion of steel in white liquor and in liquor samples to which polysulfides or sodium thiosulfate had been added at the boiling temperature. Here the marked preventive effects of $Na_2S_{4.5}$ are shown clearly. Apparently anodic protection proved more advantageous than did cathodic protection. For various cooking conditions, the number of electrodes required in giving anodic protection by furnishing a required current strength must be determined individually depending on the size and form of the digester and also on the conductance of the liquor.

Seven figures and 17 references are given. Eino Uusitolo. *Paperi ja Puu* (Finland) 40,393-7; 443-446 (1958) (in English).

Wet web strength as a mill control

Measurements of initial wet strength at a pulp and paper mill are reviewed and a brief resume of the literature is given.

A possible correlation between the frequency of breaks on the paper machine and the initial wet strength of the pulps is discussed. Curves are given over a nine- and a 16-day period, showing changes in wet extension, wet strength, drainage resistance and (in the form of lines perpendicular to the base line) the breaks on the machine. Such graphs are shown in Fig. 5. The relationship between machine efficiency and sheet properties, and between the latter and initial pulp properties are discussed, together with the importance of testing the latter. Wet strength measurements may well become routine mill control tests. The importance of wet strength determinations in research and development work is stressed.

In conclusion, the author describes the instrument used and its operation in making strength measurements. Special features of handsheet formation is also described. Corrections to standard basis weight and standard sheet dryness are discussed and shown graphically. Several groundwork samples with varying degrees of freeness and a groundwood-sulfite pulp mixture are shown in a diagram (Fig. 6). This shows the errors caused by correcting to basic weights in which curves are replaced by straight lines passing through the

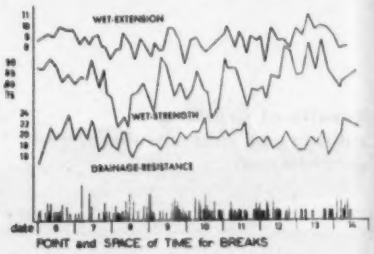


Fig. 5

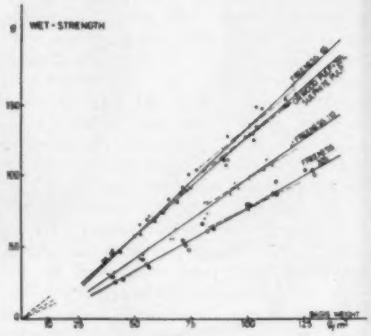


Fig. 6

origin. Fourteen figures and 24 references. Uddo Ullman. *Svensk Papperstidn* 61,443-455 (1958) (in Swedish with English summary. Captions of all graphs are given in English).

The barking of aspen wood

The older cumbersome method of hand barking used in Italy has been replaced by the use of drum barkers. This is a report on the barking of (often green) aspenwood after a preliminary hot water treatment.

Green unbarked wood, when processed in drum barkers alone, required about 2 hrs. Even under these conditions an appreciable amount of the bark still remained on the bolts. It was found that by a 4½-hr. pretreatment with water at 90° C, followed by about 45 min. in the Pascke barking unit, even green wood could be barked successfully, and that only very little bark remained. In the case of unbarked wood that had been stored five months the wood could be barked satisfactorily either with or without the hot water pretreatment.

Sketches show the hot water equipment and the Pascke barking unit. The properties of the ensuing mechanical pulp formed from aspenwood barked in this way are tabulated and discussed. The hot water pretreatment and drum barking gives a better pulp than when the wood is barked by hand. A few data are also given for the barking of spruce wood.

Two tables and one figure are given. No literature references are given. U.Fenchel. *Wochbl. Papierfabr.* 86, 793-796 (1958) (in German).

NEW PRODUCTS

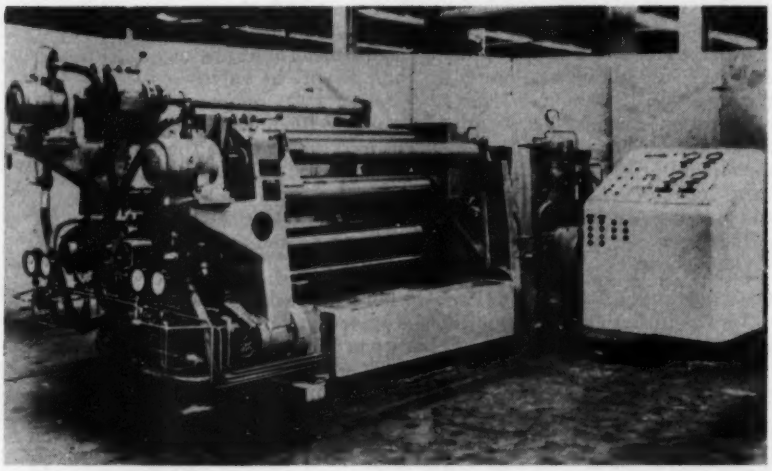
These items are numbered for your convenience. Further information on the various products described may be requested at no obligation through our Readers' Service Dept. Use the business reply card in this issue.

Shear tester device

Eight years work by the TAPPI Hydraulics Committee has resulted in the marketing of a new shear tester. This new device measures yield stress that can be used to determine new correlation parameters that promise to play the same role in stock hydraulics as the Reynolds number plays in true fluid flow work.

Yield stress is measured by simply placing the shear tester on the surface of a stock sample and slowly rotating the handle. Torque transmitted through a spring causes the dish to rotate, which in turn causes elastic deformation of the stock. Continued advances of the handle increase the scale reading until the yield stress value of the stock is reached. This value is read directly from a clearly-marked scale. Further advance of the handle causes a drop in the reading as the stock "fails" in shear. *Fischer & Porter Co.*

Circle No. 11 on Readers' Service Card



Foil separating machine

Here is a new separating and rewinding machine designed to separate two-ply aluminum foil and rewind up to 30-in. diameter. It can handle rolls up to 60 in. wide and has a maximum running speed of 2000 fpm.

The rewind shafts are hydraulically-driven, with automatic pressure-compensating controls to maintain constant tension at the rewind. The machine utilizes the burst-cut slitting principle. *Cameron Machine Co.*

Circle No. 14 on Readers' Service Card

Feedwater heater closures

A high-pressure closure has been designed to bring operating advantages to the Ross feedwater heaters and other high-pressure, high-temperature exchangers produced by Ross Heat Exchanger.

To provide a greater safety factor, structural design is very conservative. Hydrostatic load is transmitted directly to the channel cover to be carried by the heavy buttress engagements. Stresses of shear and bearing for the load-carrying channel and cover are much lower than required by the ASME code. In addition, the bearing surfaces for both these components are identically spaced for uniform load distribution. *Ross Heat Exchanger Div., American-Standard.*

Circle No. 12 on Readers' Service Card

Asphalt size in new form

Lukonite is the name of a new instantly-dispersible dry asphalt size now being offered.

This new form of asphalt size offers a convenient method of incorporating asphalt in paper and board with trouble-free operation on wires and felts. Mills using Lukonite in production have reported remarkable results in both increased paper and board strength and increased water resistance.

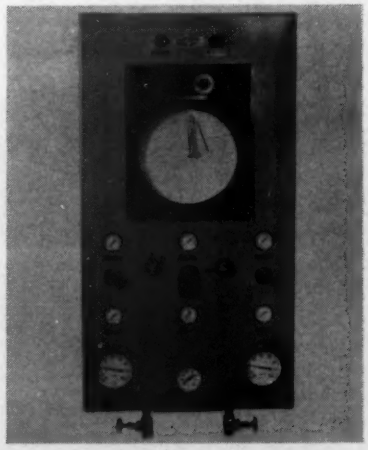
The dry pack saves on shipping and eliminates freezing problems. *Lukon Inc.*

Circle No. 13 on Readers' Service Card

Pipeline strainers

A new line of pipeline strainers made of Ductile (Nodular) iron is now being produced. These strainers are designed to withstand pressures of 600 psi at 650°F. They are available for standard pipe sizes from ⅜ to 2 in. *Jayme Organization Inc.*

Circle No. 15 on Readers' Service Card



Moisture control instrument panel

A new instrument panel for its Pres-Ten-Trol automatic moisture control system is announced by Stickle Steam Specialties Co.

The new panel incorporates red and

Let's talk about–

WHAT THIS KIND OF OPERATING EASE MEANS IN HANDLING YOUR PULPWOOD!

To maintain full day operator efficiency, Northwest engineers developed and pioneered the "Feather-Touch" Clutch Control. This device utilitizes the power of the engine to throw the heavy Drum Clutches. Over the years the "Feather-Touch" Clutch Control has been refined and improved to a high point of efficiency.

Here, ease of operation is made possible by a simple, understandable, mechanical device—just a drum and brake band and the necessary linkage—nothing more. It is completely free of complicated and delicate mechanisms. There are no long lines of tubing, no pumps, no compressors or valves—nothing to fill! It is unaffected by weather or temperature and it requires no special knowledge or outside help for adjustment. The action of the clutch is in direct ratio to the movement of the operating lever and the operator does not have to maintain pressure on the operating lever to keep the clutch engaged. It is extremely sensitive and the *true feel of the load* is always present. Release is positive and straight manual control can be introduced at any time.

On a Northwest the operator knows where he is every second of his operating cycle. At once he has smooth, effortless control with freedom from the maintenance problems that come with complicated control devices. This means greater output and less downtime in the pulp yard. The "Feather-Touch" Clutch Control is pictured in detail in Northwest catalogs. We'll be glad to send you one on the size machine you need.

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National Container Corp.
Kalamazoo Vegetable Parchm
Champion Paper Company
St. Regis Paper Co.
Scott Paper Company
Marathon Mills
St. Joe Paper Co.
Abitibi Power & Paper Co.
Charmin Paper Products Co.
B. F. D. Paper Co.
Brown Paper Mill Co.

NORTHWEST

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NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 50-Ton Capacity	¾ Yd. to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

New Products . . .

green lights to indicate whether the system is operating on tension control or pressure control and an "Auto Shift" switch that permits the operator to change instantly from automatic to manual control of steam. During normal operation the green light is on. In case of a break, an electric eye control turns on the red light and automatically switches the system from tension control to pressure control and maintains a pre-set level. The operator may then use the "Auto Shift" to shut off steam entirely for manual operation.

The panel contains all controls and instruments for regulating, indicating and recording steam pressure in the dryers and moisture variation in the sheet. A 24-hr. chart gives a permanent record of each run.

The Stickle system automatically maintains the exact moisture content desired within ½ of 1 per cent by regulating the steam flow to the dryers. Operation is described in a bulletin now being offered by the company. *Stickle Steam Specialties Co.*

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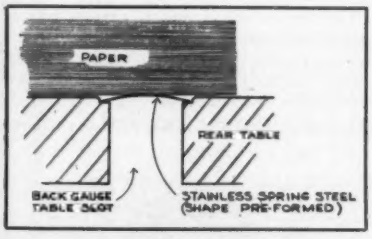

Table slot closing device

A new device for paper cutters that automatically closes the rear table slot in which the back gauge rides, thus preventing paper from snagging when the machine is being loaded or the paper is being "swung", is now standard equipment on all Lawson Pacemaker paper cutters.

As shown in the drawing (above), the smooth rounded surface of the steel strip supports the lift of paper across the slot. The paper positively cannot snag, according to the manufacturer, when swinging the lift or during rear loading operations. *Lawson Co. Div., Mieble-Goss-Dexter Inc.*

Circle No. 17 on Readers' Service Card

Hogger

New hogger models have been designed specifically for chopping paper and paperboard into sizes that can be air-conveyed to a baler or beater.

These new models are said to be capable of hogging up to 10 tons per hour of corrugated board, upright corrugated boxes, books, magazines and paper cores up to 5 in. in diameter. A special grid can also be provided to pulp classified materials such as maps, drawings, confidential files and tabulating cards.

Three standard sizes are available with 36-, 48- and 60-in. wide feed openings and powered by 25-, 50- or 75-hp motors. All motors are machine-mounted and do not require separate bases or drives. *Balemaster Div., East Chicago Machine Tool Corp.*

Circle No. 18 on Readers' Service Card

Continuous pulp bleaching system

A new continuous system for bleaching pulps produced by chemical, semichemical and mechanical processes has been produced.

The system is designed and engineered for each individual mill. A wide choice of materials of construction provides necessary corrosion resistance where required, and flexible fabricated design allows ideal location of components at each installation. *Dorr-Oliver Inc.*

Circle No. 19 on Readers' Service Card

Corrosion-resistant valve

A new valve called the Rovalve is now on the market. This valve is said to handle pulp stock, slurries and sludges as efficiently as it does pure liquids and gases with the same operation previously expected only of the costlier heavy-duty valves.

The valve is available in wafer, standard or special dimensions. Motor or cylinder mount for automatic operation are available at no extra cost. *W. G. Rovang & Associates Inc.*

Circle No. 20 on Readers' Service Card

Paper machine oil

Sixteen months field testing of a new paper machine bearing lubricant is said to have shown dramatic results in maintaining additive effectiveness and filter bag life.

Known as 790 Paper Machine Oil HD Improved, this oil has been specifically developed to overcome the problem of additive depletion and filter bag deterioration that sometime arise in the lubrication of a paper machine. *Texas Co.*

Circle No. 21 on Readers' Service Card

Spiral bevel drives

Moore & White Co. has recently finished installing five new spiral bevel drives for an eastern paper company. The new drives have replaced the old open (wood-filled) drives.

Four of the new drives are being used on the paper drying section, while the other is driving the calender stack at the wet end. The horsepower of the drives range from 50 - 75 hp, depending upon the work load. *Moore & White Co.*

Circle No. 22 on Readers' Service Card

Boiler feedwater treatment

A new product called Betz Hyzeen has been introduced to the market. This is a hydrazine product specially designed and

A New Filling Combination that will

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E.D. Jones Adapta-Plug

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Adapta-Plug - a revolutionary advance, this is strongest plug design developed; completely bandless; easiest to strip and fill.

Fulbar Shell Fillings - rigid, one-piece, with no keys or wedges, saves hours of installation time. Famous Nowave design. Made to fit shell of any Jordan.

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BUILDERS OF QUALITY STOCK PREPARATION MACHINERY
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is a brush

is a brush"

Poetically speaking, true! But there's no brush like a Jenkins' METLKOR brush. Paper Mill men everywhere say it's true. There are "Look-Alikes", "Just-as-Goods", "Steals", "Terrific Bargains" . . . but only one Jenkins' METLKOR. They are built better, to perform better, to last longer. Result . . . improved product, greater satisfaction and economy.

JENKINS' PAPER MILL BRUSHES

Blanket washer • Coating • Conveyor • Dampening • Dusting • Feed • Felt cleaning • Flocking • Fourdrinier wire cleaning • Nutmeg roll cover • Offset powder removal • Paint brush • Polishing • Scrap removal • Sieve • Spray • Static elimination • Void detector • Web cleaning.

BRUSHES FOR PRINTERS: Cylinder hold down • Dusting • Nutmeg roll cover • Offset dampener roll cleaning • Offset powder removal.

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recommended for boiler feedwater treatment.

Betz Hyzeen is a 35-per cent aqueous solution of hydrazine that is non-flammable and has neither flash nor fire point. It is safe and presents no unusual handling or storage problems. *Betz Laboratories Inc.*

Circle No. 23 on Readers' Service Card

Horizontal split case pumps

A complete line of horizontal split case pumps for hot and cold water handling, designated as the "AquaLine", has been introduced to the market.

Primarily designed for the general purpose applications of the building trades, these pumps are available in shaft-sealed types in 1½- to 4-in. discharge sizes and in packing gland types in 4- to 8-in. discharge sizes. *Peerless Pump Div., Food Machinery & Chemical Corp.*

Circle No. 24 on Readers' Service Card

Boiler scale removal techniques

The development of a new technique for hydroxy apatite boiler scale removal is said to reduce downtime as much as 30 hrs. for high make-up industrial boiler cleaning.

This technique makes use of chelating agents that are introduced into the boiler system as a water solution and circulated at low pressures until the reaction is complete. The company has stated that when this technique was applied to industrial boilers it resulted in a boiler that was 80-90 per cent bare metal clean. *Dow Chemical Co.*

Circle No. 25 on Readers' Service Card

Wax lining

A new wax lining process has been developed. Called Hevi-Kote, this process is stated by the manufacturer to build up a measurably thicker, denser wax coating without increasing bag weight and cost.

By minimizing wax penetration into paper fibers, the new process accumulates more wax on the surface to achieve better coverage and body without over-waxing. Samples, designs and prices are available. *Moser Bag & Paper Co.*

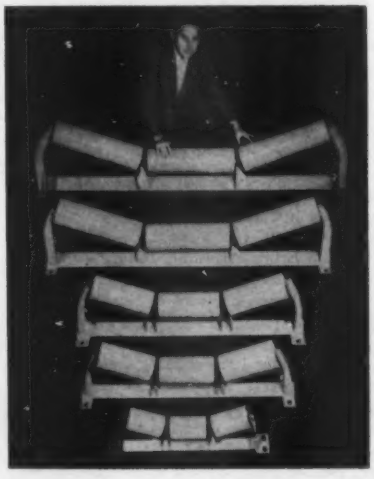
Circle No. 26 on Readers' Service Card

Fragrances in paper stock

Fragrances can now be imparted to fiberboard and many other types of paper stock by incorporating odor-retentive chemicals that have been placed on the market. The chemicals are incorporated in the pulp in forms such as crystalline solids or as liquids.

Almost any known fragrance can be produced by these compounds. They are very light in color, and it is said that the color of the finished paper stock is not affected. Test samples for specific application conditions can be prepared by *Tyrex Drug & Chemical Corp.*

Circle No. 27 on Readers' Service Card

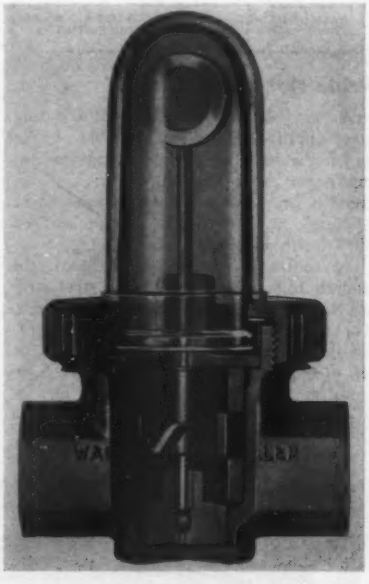


Belt conveyor idlers

An expanded new line of belt conveyor idlers has been introduced.

The five series of idlers, designated as Series 5000 through 9000, make possible the exact matching of idlers to specific operating requirements of all belt conveyor applications. *Link-Belt Co.*

Circle No. 28 on Readers' Service Card



Flow indicator with adjustable range

Pictured above is a new flow indicator that is able to show at a glance whether flow is taking place.

The indicator is said to be clearly visible from a distance even in bad light. A chromium-plated ring spinning under a

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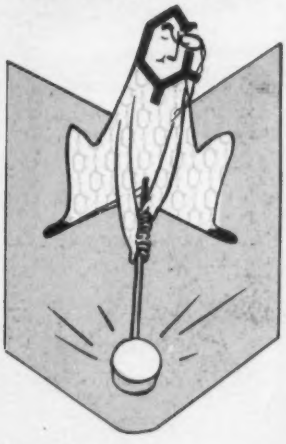
voted most successful in surface sizing



INCREASED BURSTING AND TENSILE STRENGTH

Make certain that you use Penford Gums to prepare your surface sizings. So significant are these improvements in both sheet strength as well as in surface characteristics that the quality of the base stock can often be reduced — and still maintain the quality standard of your finished sheet!

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As compared to conventional starches, Penford Gums improve the brightness of your sheet and increase the opacity of your paper.

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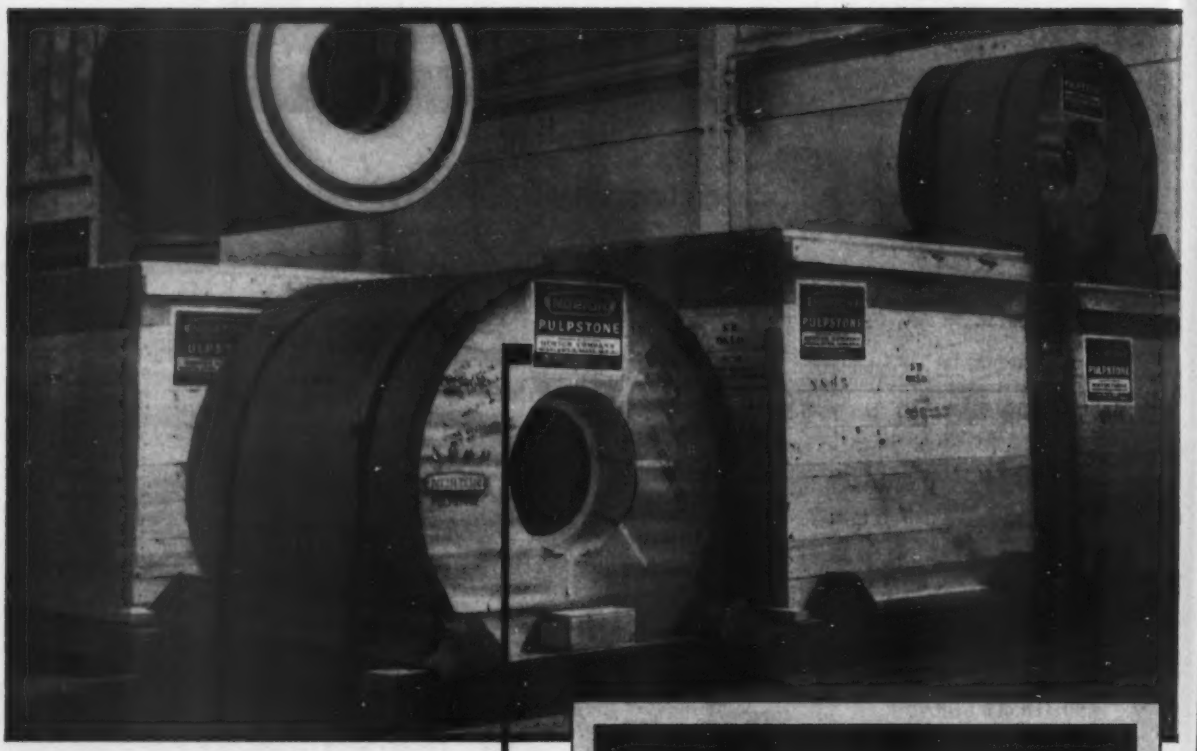

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NORTON COMPANY
WORCESTER, MASS., U. S. A.
The World's Standard
For Mechanical Pulp

"The World's Standard for Mechanical Pulp"...

. . . because it insures for each mill the high quality pulp that it requires . . . because each Norton Pulpstone is carefully engineered to meet each mill's individual requirements.

A Norton Pulpstone Engineer will study your mill and make specific recommendations based on your type of wood, your kind of grinders and the type of pulp you want to produce. He has available several types of abrasives (both ALUNDUM* and CRYSTOLON*), and a number of bonds — including the increasingly popular G bond. He can vary grit size, grit spacing, and stone hardness to suit your individual requirements.

Norton Pulpstones are produced in two modern plants–at Worcester, Massachusetts, and Hamilton, Ontario–assuring a dependable source of supply.

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EXPORT: Norton Behr-Manning Overseas Inc., Worcester 6, Mass.

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Abrasives - Grinding Wheels - Grinding and Lapping Machines
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New Products . . .

toughened glass dome has definite movement that precludes chance of misreading.

These variable flow models can be easily reset in the field for high or low range and are available with die-cast brass body in ½-, ¾- and 1-in. pipe sizes for flows from 0.72—24 gpm. Other models are available for flows from 0.075—120 gpm in pipe sizes up to 3 in. *Walker Crosweller Div., McIntosh Equipment Corp.*

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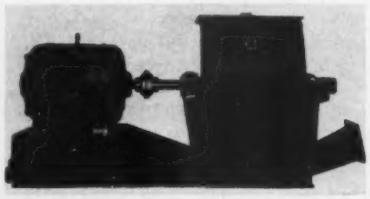
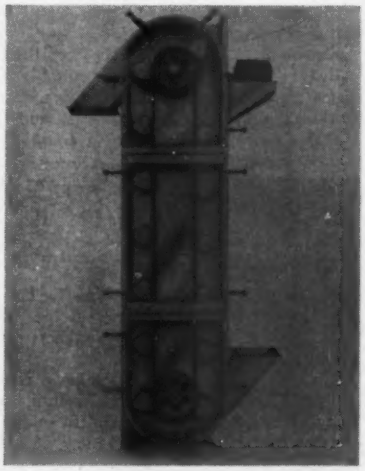


Hammermill

The availability of a special hammermill with a 26-in. rotor length has been announced. The new design permits the continuous handling of sheeted rolls that are a full 24 in. in width.

In addition to this wider feed throat and longer rotor, the hammermill is designed so that it can withstand 100-per cent overload for varied lengths of time. This was necessary for the handling of continuous sheets because of the double thickness at the spliced areas in the sheeted rolls of alpha cellulose pulp. *Sprout, Waldron & Co. Inc.*

Circle No. 30 on Readers' Service Card



Bulk material conveyor elevator

An announcement has been made of the manufacture of a new material conveyor elevator called the "V" series Buck-El. The elevator features ease of cleaning that is made possible by the cantilever design. This permits complete removal of casing covers, pulleys and belting without disturbing bearings, mechanical seals or operating machinery.

The unit is available in stainless steel, carbon steel, galvanized steel—or a combination of these materials. It is also offered in five basic sizes. Capacity range is from 4 to 40 cfm. *Bucket Elevator Co.*

Circle No. 31 on Readers' Service Card

Heat exchanger motor

A dc heat exchanger motor designed to provide a wide adjustable speed range is now available. The motor is also intended for constant-speed applications and is available in ratings from 25 to 300 hp.

The motor is designed for indoor or unprotected outdoor service and can be mounted floor horizontal, wall or ceiling horizontal or vertical with the shaft up or down. *Louis Allis Co.*

Circle No. 32 on Readers' Service Card

Glass paneling

Thinlite is the name given to a new prefabricated curtain wall system that makes it possible to construct buildings that "control" the sun.

This panel system incorporates all of the structural members and basic sun-controlling glass tile. Built-in prisms in the 2-in. hollow glass tile control the sun by rejecting solar heat during critical sun positions while at the same time transmitting cool, ground-reflected daylight. This is said

THE LARGEST CENTRIFUGALLY CAST STEEL ROLLS EVER MADE — FOR THE LARGEST STRETCHING TABLE IN THE WORLD... 43 inches in diameter, over 400" wide, weighing 13 TONS each! Movement is accomplished by Eastwood-designed carriers on which the rolls are cantilevered for placement. The axle loading on the carrier wheels is greater than the wheel loading on the heaviest locomotive. Electronic controls provide ease of movement with pinpoint accuracy. **This is just one phase of our constant modernization and automation program.**

EASTWOOD-NEALLEY CORP.
BELLEVILLE NEW JERSEY

New Products . . .

to make air conditioning more economical and provide insulation during cold weather. *Kimble Glass Co., subsidiary of Owens-Illinois Glass Co.*

Circle No. 33 on Readers' Service Card

Back pack for tree marking

A 1-gal. capacity back pack is now being manufactured for use in tree-marking operations. For large-scale marking operations this new pack should prove invaluable in reducing stops and time-outs for reloads.

Using the 1-gal. can in which the paint is shipped from the factory as the container for the back pack, the messy and time-consuming transfer of paint is eliminated entirely. As the paint is used up, the empty can is thrown away and a new can quickly clipped into place.

The manufacturer has made this improvement from the suggestion of numerous foresters. *Nelson Co.*

Circle No. 34 on Readers' Service Card

Portable conveyor unit

This is a trailer-mounted combination positive and negative pressure pneumatic handling system that is now available. There are unlimited possibilities for in-plant handling of granular free-flowing materials with this unit.

Over-all height of the system is several inches less than 8 ft. Specific capacities for handling a variety of chemicals, plastics and similar dry, free-flowing materials can be quoted on request. *Sprout, Waldron & Co. Inc.*

Circle No. 35 on Readers' Service Card

Grease

Announcement has been made of a new type of grease that is said to be highly resistant to most fuels and solvents. It is also said to be impervious to the washing action of a wide range of petroleum, coal tar and chlorinated liquids.

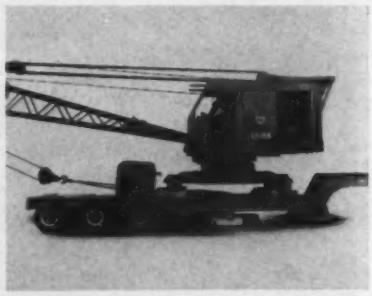
According to the manufacturer, the new grease permits normal lubrication of pumps, bearings and sliding surfaces that must work in the presence of solvents and liquid fuels. *Pennsylvania Refining Co.*

Circle No. 36 on Readers' Service Card

Anti-skid coating

An anti-skid coating called Ludox is now on the market for boxboard manufacturers. This product, when applied to boxboard containers, is said to have slip-resistant characteristics and also to provide a certain amount of soil retardancy. *E. I. du Pont de Nemours & Co. Inc.*

Circle No. 37 on Readers' Service Card



Crawler crane

Pictured above is a new 40-ton crawler machine that walks and lifts more than its own weight. For fast, job-to-job transport it can be stripped down to an 8-ft. over-all width and to approximately 32,000 lbs. within 2 hrs.

With a crawler base that is 15 ft. long and over 14 ft. wide (with 42-in. shoes), the new LS-108 has a spread-eagle stance that gives it exceptional stability. Unassisted, it will pick and handle 160 ft. of the optional Hi-Lite tubular boom and jib. *Link-Belt Speeder Corp.*

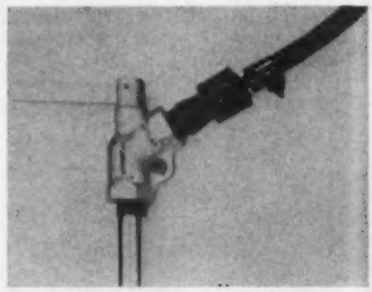
Circle No. 38 on Readers' Service Card

Metal tube rotameters

A new line of metal tube rotameters has been introduced to the market. These units are designed for service with hazardous and high-pressure fluids at temperatures up to 400°F.

Designated as Fig. 1900-F Metal Tube Rotameters, these instruments are available in a variety of sizes that for water provide capacity ranges of 0.24 to 2.4 gpm for the smallest rotameter and 10 to 100 gpm for the largest. *Schutte & Koerting Co.*

Circle No. 39 on Readers' Service Card



Air service valve

A steel air service valve is now available for all plant air service lines.

The company states that positive shutoff is accomplished by means of a spring-loaded, long-lasting rubber plug. This plug gives the valves the name of the Stopple valve. With no wearing, such as occurs in a metal seated valve, the maintenance of this unit is reduced.

Valves are available only with cadmium-plated steel bodies and ¾-in. npt outlets. Inlets may be either ¾-in. or 1-in. npt. *Rutherford Co. Inc.*

Circle No. 40 on Readers' Service Card

Variable-speed pulleys

Constant speed regardless of wide variations in load is a major feature of an economy line of variable-speed pulleys that is now available.

Known as the Hi-Lo FHP line, these pulleys are extremely compact in both diameter and length. They are available in three horsepower ratings: ½, ¾ and 1 at 1750 rpm. *Lovejoy Flexible Coupling Co.*

Circle No. 41 on Readers' Service Card

Plastic belting

A strong, durable industrial plastic belting that can be made endless on the job in a few minutes without fasteners or sewing has been developed.

Made of pre-stretched polyamide plastic and called Dixylon, the new belting is being manufactured in all standard widths and thicknesses for a wide variety of applications.

The belting is made with a non-slip running surface that eliminates any need for belt dressing. The company states that this plastic belting has high resistance to temperature, humidity, oils and most acids. *R. & J. Dick Co. Inc.*

Circle No. 42 on Readers' Service Card

NEW LITERATURE

Books

THE ENCYCLOPEDIA OF CHEMISTRY. Edited by George L. Clark and G. G. Hawley. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Price: $10.00.

This is a supplement adding more than 200 clear, concise articles of primary and current importance to the "Encyclopedia of Chemistry." The arrangement of the supplement is identical to that of the parent book. Articles appear alphabetically by subject. Each article is written by a respected authority in science and/or industry.

A wealth of information is contained here for those who seek to understand current scientific events by referring to such topics as antidotes, porphyrins and scores of others.

FUNDAMENTALS OF PAPERMAKING FIBRES. Published by the Technical Section of the British Paper & Board Makers' Association Inc., St. Winifred's, Welcomes Rd, Kenley, Surrey, England. Pages: 487. Price: $10.54.

This volume contains the papers presented at an international symposium on Fundamental Aspects of Fibres and their Treatment for Papermaking, held at Cambridge in September 1957 under the auspices of the Technical Section of the British Paper & Board Makers' Association.

The purpose of the symposium was to assemble the world experts for a critical review and discussion of this chosen subject in order to enhance the understanding of the beating process.

The four sessions included: (1) The morphology of pulp fibers; (2) The chemistry of pulp fibers; (3) Properties of bonded fiber assemblages, and (4) The process of beating.

AMERICAN BUSINESS DICTIONARY. By Harold Lazarus. Published by Philosophical Library Inc., 15 East 40th St., New York 16, N.Y. Pages: 521. Price: $10.00.

The author has endeavored to present a business vocabulary to meet the daily reference needs of businessmen. The terms, business and government institutions, concepts, procedures, job titles, monetary units, laws and abbreviations most commonly referred to in modern American business are defined and described in what the author hopes is a clear, correct and compact volume.

VINYL RESINS. By W. Mayo Smith. Published by Reinhold Publishing Corp., 430 Park Ave., New York 22, N. Y. Pages: 282. Price: $5.75.

The author has surveyed the applications of vinyl resins against background information on their types, properties, chemistry, manufacture and fabrication.

Every attempt has been made to cover all recent advances in the vinyl field. New polyvinyl chloride "pearls" and Delrin resin are included. The treatment of polymerization systems for vinyl chloride is developed in detail.

Many items expected to show unusual growth such as vinyl laminates, rigids, foamed material and latex paints are brought clearly into focus.

This book should serve as a source of practical information pertinent to manufacturers, fabricators and market developers.

USDA Reports

TECHNICAL NOTES. Here is a listing of Technical Notes that are available. No. 537—"Growth and Development of 12 Seed Sources of Norway Spruce in Lower Michigan"; No. 538—"Effect of Gibberellic Acid on Forcing Hardwood Cuttings for Pollen Collection", and No. 539—"Forest Planting Trends in Northern Lower Michigan". Copies are available by writing to M. B. Dickerman, director Lake States Forest Experiment Station, U. S. Department of Agriculture, St. Paul 1, Minn.

STATION PAPERS available from the Lake States Forest Station. Station Paper No. 61 gives the Silvical Characteristics of Jack Pine; Station Paper No. 62 gives the Silvical Characteristics of American Basswood, and Station Paper No. 63 gives the Silvical Charicteristics of Bigtooth Aspen. All three studies are available by writing to M. B. Dickerman, director Lake States Forest Experiment Station, U. S. Department of Agriculture, St. Paul 1, Minn.

Manufacturers' Publications

These items are numbered for your convenience. Copies of the publications may be requested at no obligation through our Readers' Service Dept. Use the handy business reply card which accompanies this issue.

Complete white water treatment in a tissue mill

Graver Water Conditioning Co. Div., Union Tank Car Co. announces a publication titled, "Complete White Water Treatment in a Tissue Mill". This is a technical reprint telling how a tissue mill changed over from a pressurized flotation saveall unit to a closed-cycle flotation system and consequently made great savings in pulp and water recovery.

Circle No. 43 on Readers' Service Card

Register control

General Electric Co. describes the company's complete line of register controls. Simplified design and ease of installation are illustrated by photographs, line drawings and a chart.

Circle No. 44 on Readers' Service Card

Stainless steel piping

Alaskan Copper & Brass Co. is issuing a 48-page catalog that lists the pipe and tubing, welding fittings, stub ends and welding rings and lightweight backing flanges produced by the company. The catalog also gives pictorial highlights in the manufacture of the products.

Circle No. 45 on Readers' Service Card

Heat exchangers and pressure vessels

Southwestern Engineering Co. offers a bulletin titled, "Sweco Heat Exchangers and Pressure Vessels". The bulletin gives photos and technical drawings to describe these units.

Circle No. 46 on Readers' Service Card

Craftsmanship in steel

Chicago Bridge & Iron Co. is offering copies of a booklet titled, "Creative Craftsmanship in Steel". The four-page booklet illustrates and describes the company's storage and pressure vessels, coordinated engineering, fabrication and erection services.

Circle No. 47 on Readers' Service Card

Custom gears

Illinois Gear & Machine Co. has just issued an illustrated brochure on its products, plant facilities and quality control facilities. Information on capacities, types, processes, materials, heat treatments, equipment, etc. are also given.

Circle No. 48 on Readers' Service Card

Humidifier

Southworth Machine Co. explains in a 4-page bulletin how moisture and static problems can be solved with the Southworth humidifier. Better circulation, sensitive control and flexible power are the features of this unit.

Circle No. 49 on Readers' Service Card

Polyethylene technology

U. S. Industrial Chemicals Co. Div., National Distillers & Chemical Corp. is issuing a 100-page handbook, "Petrothene Polyethylene—A Processing Guide". The company believes that this is the first work designed to tell the complete story of polyethylene in a single booklet with a minimum of repetitive detail and highly technical jargon.

Circle No. 50 on Readers' Service Card

Building industrial scale models

Scott Industries Inc. has just announced the release of a new catalog called, "Designing in 3-D". The catalog contains instructions for assembling and description of thousands of parts and materials used in building industrial scale models. In almost every design or sales engi-

POSTERS
— A POTENT SAFETY TOOL

Posters should be one of the top aids in your safety program. No other safety medium can reach your entire audience—not once, but many times each day—with such low-cost safety messages. They are directed at the worker acts and worker attitudes that lead to accidents. Posters lend *timeliness, repetition and continuity* to your safety program . . . the three fundamental principles of direct selling.

The National Safety Council maintains a stock of posters that covers all industries, operations and phases of safety and health. These posters are produced in two sizes: "A" size, 8½"x 11½", and "B" size, 17x23". Their colorful illustrations and eye-catching captions make them ideal for the mass selling of safety.

Write for a free copy of the Directory of Occupational Safety Posters. This 72 page catalog illustrates 744 posters, indexed and classified for specific operations.

NATIONAL SAFETY COUNCIL

425 N. Michigan Ave.
Chicago 11, Illinois

New Literature . . .

neering problem there is some portion of the work that might be done better, faster or more easily by using this "do-it-yourself" approach.
Circle No. 51 on Readers' Service Card

Cleaning units

Bird Machine Co. gives a description of the company's Cycleans in a bulletin now being offered. These Cycleans, with automatic purge tips, are designed for effective, economical removal of shives and dirt from pulp and paper stocks.
Circle No. 52 on Readers' Service Card

Gear reducer

Western Gear Corp. announces the availability of its new SpeedMaster gear reducer catalog. The catalog contains complete engineering and selection information of the SpeedMaster line.
Circle No. 53 on Readers' Service Card

Industrial valves

Ohio Injector Co. has published a new condensed version of its general catalog that lists its complete line of industrial valves. This catalog lists over 95 per cent of the line. Valuable supplementary information is contained in a valve comparison chart, which offers a quick cross reference to the most commonly used figure numbers of ten valve manufacturers.
Circle No. 54 on Readers' Service Card

Valves

Jerguson Gage & Valve Co. is offering a catalog containing illustrations and application information on the company's valves for instrument piping and general use.
Circle No. 55 on Readers' Service Card

Magnetic equipment

Stearns Magnetic Products Div., Indiana Steel Products Co. summarizes the full range of magnetic equipment offered by the company in a new bulletin just published. After each product description, a reference number is listed so that the reader can send for a complete catalog on any of the individual products listed in the bulletin.
Circle No. 56 on Readers' Service Card

Horizontal size press advantages

Patton Mfg. Co. Inc. is offering a brochure that includes complete description of horizontal size presses, illustrations and engineering diagrams of typical installations and case histories of actual installations.
Circle No. 57 on Readers' Service Card

Steam metering

Builders-Providence Div., B-I-F Industries Inc. is issuing a new and highly-informative bulletin titled, "Accurate Steam Metering for 1- 1½-in. Lines". Along with photographs, the bulletin gives cross sectional views, dimensional drawings, capacity and accuracy tables.
Circle No. 58 on Readers' Service Card

Pipe and tubing

Fibercast Co. Div., Youngstown Sheet & Tube Co. has released a newly-published comprehensive bulletin on the company's chemical and line pipe, tubing and fittings. Complete engineering data are given.
Circle No. 59 on Readers' Service Card

Ultra-pure water

Graver Water Conditioning Co. is offering a technical reprinted article titled, "Ultra-pure Water—Prime Requisite for Nuclear Power Plant Cycles". The article discusses the reasons for the extreme water purity requirements in nuclear cycles, including considerations of efficient heat transfer, radioactivity, corrosion, materials of cycle construction and fuel element fracture.
Circle No. 60 on Readers' Service Card

Wax sizes for the paper industry

Paper Chemicals Div., Nopco Chemical Co. has published a booklet describing four series of wax and rosin-wax sizes for the paper and board industries. The various grades, together with their uses in internal and surface sizing and in coating colors, are fully discussed.
Circle No. 61 on Readers' Service Card

Flow tubes for metering fluids

Builders-Providence Div., B-I-F Industries Inc. describes the Dall flow tube used for metering water and other fluids. The bulletin contains photographs, dimensional and capacity tables, installation diagrams, a pressure-reccovery performance chart and explanatory text.
Circle No. 62 on Readers' Service Card

The Paper Industry
Professional and Business Services

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Paper & Pulp — Reports
Water & Waste — Appraisals
Steam & Hydro Power — Steam Utilization

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The N. P. BOWSHER Co., South Bend, Ind.

Eight Publications for Papermakers

Pulp and Paper, Volume 1	$18.00
Pulp and Paper, Volume II	18.00
Paper and Paperboard Making	6.00
Technology of Paper Coating	2.00
Lessons in Papermaking—Part 1	1.50
Lessons in Papermaking—Part 2	1.50
Notes and Observations on Beaters	1.00
Trouble on the Paper Machine	.75

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for pulp and paper company which will build a 500-ton per day average kraft pulp and linerboard mill to be located on the Tennessee River with excellent opportunity for future growth and expansion. Among qualifications required are: thorough knowledge of accounting and its application to industry and timberland operation; age between 35 and 50; should have experience from Southern kraft pulp and paper industry; imagination and initiative; to act in over-all advisory capacity to local officer in charge of complete operations. Position has excellent opportunities of growth in future. Only well-qualified applicants will be considered. Applications will be considered confidential.

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Engineering experience, craftsmanship, selected top-grade tank lumber . . . your guarantee of satisfaction. For large tanks or small, see *Kalamazoo* first. Free estimates and suggestions.

WOOD TANK DIVISION
Kalamazoo TANK and SILO CO. 457 HARRISON ST. KALAMAZOO, MICH.

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SUCTION BOX COVER

The characteristics of end grain Maple naturally provide a smooth, even, long wearing surface. Laminated plastic cross members support the Maple end grain lands. LOVAC construction eliminates sag.

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- ★ GIVES LONGER WIRE LIFE
- ★ EVEN VACUUM
- ★ BETTER FIBRE FORMATION
- ★ BETTER TENSILE STRENGTH

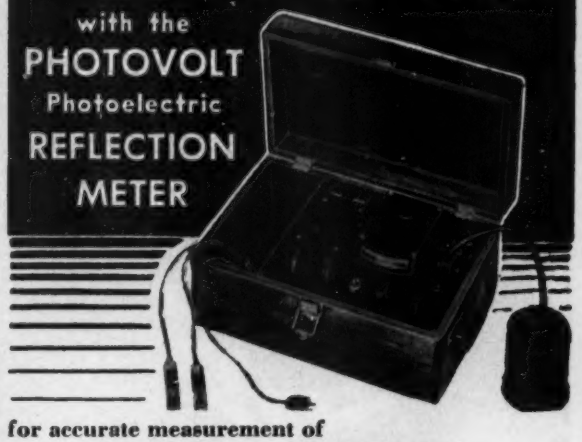
MADE BY THE MANUFACTURER OF RES-LIN AND MET-AL-RIB SUCTION BOX COVERS

Write for nearest representative, data sheet and literature.

APPLETON WOOD PRODUCTS CO. APPLETON · WISCONSIN

You Can Be Sure!

with the PHOTOVOLT Photoelectric REFLECTION METER



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Brightness and Opacity
of pulp and paper in terms of TAPPI specifications.
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tests on paper, card board, and other paper products.
Portable, reliable, rugged, simple to operate
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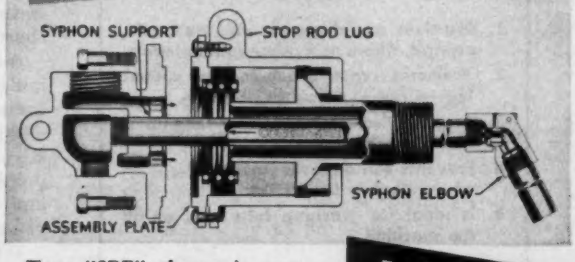

Type "SBP" shown is completely self-supporting. Like all Johnson Joints it has no packing, needs no lubrication or adjustment. The syphon elbow replaces unwieldy curved condensate drainage pipes with two straight pipes, hinges to pass right through the joint. Write for Bulletin S-3002. Johnson Rotary Pressure Joints are available for all operating speeds, pressures, mountings.

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D-I LESTOIL

1. Dissolves and disperses ink, wax, oils, asphalt, fillers and other contaminants.
2. Promotes rapid and complete defibering — makes fibres free-flowing.
3. Keeps entire system clean — helps prevent slime deposits.
4. Prevents soil deposits and build-ups on wires, Yankee Dryers, etc.
5. Is ideal for washing felts — on or off the machine.

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LIQUID DETERGENT

Want to get good, clean, low-cost furnish from mixed wastepapers or other low-grade materials? — Or from rope, rags, cotton linters or cotton mill sweeps? Want a cleaner, clearer sheet with a look of quality that spells profit?

d-i LESTOIL can help you do it — without expensive formulas, without changes in your present equipment and at a saving in time, labor and power.

d-i LESTOIL combines thorough wetting, penetrating, emulsifying and dispersing actions. Added to stock in the boiler or pulper, it quickly and thoroughly removes ink, grease, wax, asphalt, adhesives and other contaminants, and prevents their redeposit in the stock.

What's more, d-i LESTOIL promotes rapid and complete defibering of paper stock, and helps keep your felts, wires and your entire system whistle-clean.

Why not find out — at our expense — what d-i LESTOIL can do for you? For a generous free sample and descriptive literature, write today to

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MARKET QUOTATIONS

RAGS (Domestic)

New Cotton Cuttings

The following are brokers' and large dealers' average buying prices for sizeable lots in cents per pound f.o.b. New York:

	per cwt.
No. 1 white shirt cuttings	13.00— 13.50
Soft unbleached muslins	15.50— 16.00
Fancy shirt cuttings	4.50— 5.00
No. 1 percales	5.50— 6.00
No. 1 washables	2.25— 2.50
No. 1 light silesias	6.50— 7.00
No. 1 light prints	4.75— 5.00
Light flannelettes	6.50— 7.00
Cottonades	2.75— 3.25
Blue overall cuttings	6.75— 7.25
Blue cheviots	6.75— 7.25
Canton flannels, bleached	10.50— 11.00
Canton flannels, unbleached	10.50— 11.00
Osnaburg cuttings	9.50— 10.50
Underwear cuts, bleached	14.50— 15.00
Underwear cuts, unbleached	14.50— 15.00
Sun tan khaki cuttings	5.00— 5.50
American linen cuttings	6.75— 7.25

Cotton Rags

The following are prices, cents per pound, paid by dealers and brokers f.o.b. New York:

	per cwt.
No. 1 roofing (Chicago)	.70— .75
No. 2 roofing (Chicago)	.50— .55
Twos and blues, repacked	1.50— 1.75
Thirds and blues, repacked	1.50— 1.75
No. 1 whites, repacked	—
No. 1 whites miscellaneous	—
No. 2 whites, repacked	—
No. 2 whites, miscellaneous	—

RAGS (Foreign)

(ex dock New York City)

New Rags

	per cwt.
New dark cuttings	Nominal
New mixed cuttings	
New light silesias	
Light flannelettes	
Unbleached cuttings	
New white cuttings	
New light oxfords	
New light prints	

Old Rags

	per cwt.
No. 1 white linens	Nominal
No. 2 white linens	
No. 3 white linens	
No. 4 white linens	
No. 1 white cottons	
No. 2 white cottons	
No. 3 white cottons	
No. 4 white cottons	
Extra light prints	
Ordinary light prints	
Medium light prints	
Dutch blue cottons	
French blue cottons	
French blue linens	
Checks and blues	
Linsey garments	
Dark cottons	
Old shopperies	

ROPE and BAGGING

F.o.b. and ex dock New York City

Gunny No. 1, domestic	—
Gunny No. 1, foreign	—
No. 1 manila rope, domestic	—
No. 1 manila rope, foreign	—
New burlap cuts (soft)	—
Sisal strings	—
Mixed strings	—

WASTE PAPER

The following are prices, dollars per net ton, paid by brokers and large dealers for carload quantities of baled stock, f.o.b. cars New York:

No. 1 hard white envelope cuttings	90.00—100.00
No. 1 hard white shavings	80.00— 85.00
No. 1 soft white shavings	50.00— 55.00
Soft white shavings, uncoated	50.00— 55.00
Fly leaf shavings No. 1	25.00— 27.50
Fly leaf, woody, No. 1	23.00— 25.00
Mixed colored shavings	21.00— 23.00
No. 1 books and magazines	17.00— 18.00
Ledger stock, white, No. 1	50.00— 52.50
Ledger stock colored, No. 1 (Midwest ship)	30.00—
New manila envelope cuttings (free of groundwood)	60.00— 65.00
New manila envelope cuttings (containing groundwood)	50.00— 55.00
Manila tab cards	75.00— 80.00
Colored tab cards	50.00— 55.00
New northern kraft envelope cuttings	60.00— 65.00
Triple sorted kraft, 100%	30.00— 35.00
No. 1 old kraft	30.00—
White news cuts, No. 1	55.00— 60.00
No. 1 overissue news	22.00— 24.00
Folded news, special	20.00— 21.00
Folded news, ordinary	18.00— 19.00
Old corrugated boxes	24.00— 25.00
New jute corrugated cuts	19.00— 20.00
Mill wrappers	11.00— 13.00
Boxboard cuttings	9.00— 11.00
No. 1 mixed paper	9.00— 11.00

CHEMICALS

F.o.b. New York City

Alum, ammonium	
Granular, bags, works, cwt.	4.30—
Lump, drums, works, cwt.	5.05—
Powdered, drums, works, cwt.	5.20—
1-Arginine, drums, kilo	90.00—
Blanc Fixe	
Direct process, bags, c.l., works, ton	145.00—
L. c. l., ton	155.00—
Bleaching Powder, drums, cwt.	—
Casein, domestic acid precipitated	
30-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.56—
80-mesh bags, 10,000-lb. lots or more, shipping point, lb.	.64—
China Clay, domestic dry-ground, airfloat, 99%	
325-mesh bags, c.l., Georgia works, ton	10.00— 12.00
300-mesh bags, c.l., Georgia works, ton	13.50— 14.50
Imported, white, lump, bulk, c. l., ex dock Phila, Portland, Me., gross ton	20.00— .35.00
Chlorine, liquid	
Tanks, single units, works, freight equaled, cwt.	3.15—
Glycerine, refined (CP, USP) 98%, drums c. l., delivered lb.	.29⅜—
Litharge, commercial powdered	
Barrels, c. l., works, freight equaled lb	.14¾—
Rosin, gum, c. l., f.o.b. New York, cwt.	
K, M	9.05—
N	9.20—
WG	9.70—
WW	9.80—
Rosin, wood, c. l., f.o.b., shipping point, cwt.	
K, M	7.80—
N	7.90—
WG	8.25—
WW	8.50—
Saltcake, domestic, bulk works, 100% Na_2SO_4 basis ton	28.00—
Soda Ash	
Dense, 58%, paper bags, c.l. works, cwt	1.90—
Light, 58%, paper bags, c.l. works, cwt	1.85—
Soda, caustic	
Flake, 76%, drums, c. l. works, freight equalled, cwt	5.20—
Solid, 76%, drums, c. l. works, cwt.	4.80—
Sodium Silicate	
40°Be, 1:3.2, turbid, drums, c. l., works, cwt.	1.55—
52°Be, turbid, 1:2.4, drums, c. l., works, cwt.	2.65—
Starch	
Pearl, 140-lb. bags, cwt.	7.51—
Pearl, 100-lb. bags, cwt.	7.36—
Powdered, 100-lb. paper bags, cwt.	7.48—
Sulfur, crude	
Bulk, c. l. mine, contract, long ton	23.50—
Talc	
Domestic, fibrous, N. Y., grd., bags, c. l. works, ton	28.00—
Canadian, ground, bags, c. l. works, ton	20.00— 35.00
Titanium Pigment	
Calcium-rutile base, regular, bags, c. l., lb.	.09½—
High-tinting, drums, c. l., lb.	.14½—
Zinc Oxide Pigment, American process	
Lead-free, bags, c. l. freight allowed, lb.	.14½—
Leaded, 35%, bags, c. l., freight allowed, lb.	.15½—

WOOD PULP

Quotations on domestic and Canadian pulp, dollars per short air-dry ton delivered consuming mills including basic allowances, follow:

Bleached sulfite, No. 1	155.00—
Bleached sulfite, Canadian	155.00—
Unbleached sulfite	135.00—
Unbleached sulfite, Canadian	135.00—
Bleached soda	150.00—
Bleached soda, Canadian	150.00—
Kraft, bleached hardwood	152.00—
Kraft, bleached	157.00—
Kraft, bleached southern	160.00—
Kraft, bleached Canadian	160.00—167.50
Kraft, unbleached southern	120.00—
Kraft, unbleached, Far West	125.00—
Kraft, unbleached Canadian eastern	135.00—
Kraft, unbleached Canadian western	120.00—125.00
Kraft, semi-bleached southern	140.00—
Sulfite screenings	—
Sulfate screenings	—

Quotations on imported wood pulp, dollars per short air-dry ton on dock American Atlantic ports, follow:

Bleached sulfite, Swedish, freight allowed	155.00—
Bleached sulfite, Norwegian, del'd with limited freight allowance	155.00—
Bleached sulfite, Finnish, freight allowed	155.00—
Unbleached sulfite, Swedish, freight allowed	135.00—
Unbleached sulfite, Finnish, freight allowed	135.00—
Kraft, unbleached, Swedish, freight allowed	125.00—
Kraft, unbleached, Finnish, freight allowed	125.00—
Kraft, bleached, Swedish, on dock	157.50—162.50
Kraft, bleached, Norwegian	155.00—

PAPER

Quotations are mill quotations Chicago

Boards (prices per ton, delivered in Chicago, 10 tons or more):	
Plain chip	107.50
News vat lined chip	110.00
.009 chip, rolls	100 00
Filled news	111.50
Solid news	114.50
White vat lined chip	144.50
Chip tube and can stock	112.50
Single manila lined chip	162.50
Single jute lined chip	147.50
Container, 42-lb.	
Kraft liner (per 1000 sq. ft.)	2.68
White patent coated	
.020	175.00
.018	177.50
.016	182.50

Book Paper (f.o.b. Chicago, c.l. cases per cwt):	
No. 1 enamels	20.05
No. 2 enamels	19.05
Machine-coated, 45- to 100-lb.	15.05— 18.50
60-lb. + uncoated offset, 25 × 38 (2000 lb.)	17.05
"A" grade English finish untrimmed, 25 × 38 (2000 lb.)	16.15
Rag Content Bond (white, 5000 to 10,000-lb. sub 20, ream sealed cartons):	per cwt
100% rag	64.70
75% "	49.65
50% "	37.80
25% "	31.90
Rag Content Ledger (white, 5000 to 10,000 lb., ream sealed cartons):	
100% rag	65.85
75% "	50.80
50% "	39.00
25% "	33.10

Sulfite Bond (white, 5000 to 10 000-lb. sub 20, ream sealed cartons):	
No. 1	22.50
No. 2	21.75
No. 4	20.35
Sulfite Ledger (white, 5000 to 10,000-lb., ream sealed cartons):	
No. 1	23.70
No. 2	22.95
No. 4	21.55

Newsprint (contract base price)	per ton
Rolls, standard	135.00
Sheets	Standard differentials

Kraft Wrapping — Natural (standard rolls 9- and 15-in. diam.)	per cwt
70-lb. and heavier	8.50
60-lb.	8.75
50-lb.	9.00
40-lb.	9.25
35-lb.	9.75
30-lb.	10.50
25-lb.	11.25
20-lb.	12.25
No. 1 Kraft Butcher — Pink	per cwt
40-lb. only	10.00
(Sheets — Plus 50c cwt)	

Planning for the Sixties

(Continued from page 590)

expect that the existing capacity, plus that now being built, will be fully utilized by 1961 or 1962.

As a matter of cold reality, the emphasis within the industry will have to be changed from production to marketing if we are to utilize fully the capacity that is available to us and if the industry is to grow and develop along economic and durable lines.

Marketing, or what might be called "total marketing", is the key to full utilization of capacity. Total marketing is both the challenge and the opportunity before us. Total marketing encompasses the entire distribution system. It means more than just production development. It also encompasses stimulation of consumer demand for these products through progressive advertising and sales promotion.

In the fine paper industry the merchant channel of distribution is all important. Manufacturers expect their merchants to develop and satisfy the consumer's growing needs and to do so efficiently and economically. To do this you must see to it that they know the potentials of their markets; you must help your distributors give their customers the proper kind of help in developing their paper needs.

Planning for the decade of the sixties

Everyone knows that business is changing. In a merchandising business it is hard to see many of the technological changes that are taking place in production—but it feels the effects of them nevertheless. Merchants sell more paper as population increases and business becomes more complex. But they have the problems of greater cost of doing business in cities that have become more crowded —with their increasing traffic problems and the rising costs of real estate.

It would seem that everyone responsible for the management of a company in this field must tackle the problem of looking ahead to the next decade.

Just as paper mills must have the most efficient machines to produce at lower costs, so must paper merchants take advantage of the new improved warehouses and equipment that can do their job more efficiently and at lower costs.

This includes modern warehouses, automatic machines of all types in the office, the use of machines of any type where possible, more efficient delivery methods and a general modernization of distribution.

If you and your customers are to meet the challenge of the new opportunities that will be in the markets in the next decade, if you as well as your customers are to compete successfully—then you as well as your customers must plan for greater productivity per employee, per dollar.

This applies basically to manufacturing. It also applies to selling and distribution. Those who plan for the next decade and spend the necessary money and effort for modernization to meet the opportunities will find rewards that will more than justify the expenditures.

Theory of Adhesives

(Continued from page 595)

is evidence that polar groups contribute to a specific type of orientation at a surface. Thus, fatty acids are believed to orient in such a way that the carboxyl groups face a metal surface, whereas the hydrocarbon tails are away from the surface.

The effect of molecular weight on adhesion is another chemical factor to be considered. Obviously, very low molecular weight materials will not have adequate strength, whereas very high molecular weight materials may be inclined towards brittleness or other undesirable properties. Somewhere between the two extremes is the most desirable molecular weight for adhesiveness. That degradation of polymers is sometimes effective to obtain optimum adhesion is demonstrated by the process wherein starch is degraded or dextrinized to give products that are better adhesives than the starch itself. This is so even though a film will be much tougher than a dextrin film. These same observations apply to polymers such as rubber and certain vinyls. Animal glues, too, are most adhesive when the possess an intermediate range of viscosity.

Del Monte (3) lists the following degrees of polymerization as optimum for adhesives from the following polymeric substances:

	Polymer Units
Polyvinyl acetate polymers	60-200
Polyvinyl chloride-acetate	100-150
Polyethyl acrylate	80-150
Polyisobutylene	50-150
Polyamides	50-100
Chlorinated rubber	125 csp viscosity grade
Cellulose nitrate	150-300

The acidity or alkalinity of the glue line is still another chemical factor of importance. Strong acids and strong alkalis are usually detrimental to an adhesive bond probably due to the actual degrading effect of these materials. It is generally assumed that low acidity promotes higher bonding strength, although this has not yet been proved. On the other hand, the behavior of proteins and animal glues as adhesives depends on their use at pH's close to their isoelectric points.

Names in the News . . .

(Continued from Page 623)

ing the past two summers, **Joseph Liston,** a recent graduate of Lowell Technological Institute, has joined the Shartle Div. sales staff at Middletown, Ohio.

At a dinner honoring Appleton Machine Co.'s 75th anniversary, **Richard M. Radsch** received a special commemorative plaque in recognition of his "contributions to the success of the firm". Radsch served many years as a sales executive for Appleton Machine.

Edmund C. (Ned) Paca has been named a sales engineer in the southwestern territory for Albany Felt Co. Formerly assigned to the Midwestern territory, he succeeds **William Schaffner,** recently appointed southern district manager.

Necrology . . .

Edward C. Reid

Edward C. Reid, 57, president and board chairman of American Writing Paper Corp., died in November at his Granby, Mass. home.

A graduate of New York University, Reid joined the American Writing Paper staff at Holyoke in 1937 and was elected president in 1952.

C. Otto Bachman

C. Otto Bachman, widely-known inventor of automatic printing presses and paper converting equipment, died at his Cape Vincent, N. Y. home recently at the age of 67.

Bachman was for many years associated with the paper and printing industries, and many of his machines were built by Black-Clawson Co. He was closely associated with B-C as an engineering consultant.

Especially successful in designing automatic presses for printing dress patterns, Bachman was also the inven-

Index to Advertisers

Acme Steel Company
Adell Chemical Company 642
Albany Felt Company 581
American Cast Iron Pipe Co.
American Cyanamid Co. 578, 579
American Paper & Pulp Co., Inc. 601
Anheuser-Busch, Inc. 607
Antara Chemicals
Appleton Wire Works, Inc.
Appleton Wood Products Co. 641
Arrow Tank Co., Inc.
Asten-Hill Mfg. Co. 2nd Cover
Atkins Saw Division

Bauer Bros. Co., The
Beloit Iron Works
Bird Machine Company 604
Black-Clawson Company, The 591, 592
Bolton & Sons Inc., John W. 640
Bowsher Co., The N. P.
Buell Engineering Company 623
Burgess-Manning Company

Cameron Machine Co. 583
Carthage Machine Co. 627
Castex Paper Export Co. Inc.
Chemipulp Process, Inc.
Chicago Bridge & Iron Company
Clarage Fan Company 606
Classified Advertising 641
Clinton Corn Processing Co. 618
Corn Products Sales Co. 582

Darling & Company 3rd Cover
Dempster Brothers
De Zurik Corporation 626
Draper Brothers Company
Du Pont, Pigments Department 602, 603

Eastwood-Nealley Corporation 637
Electric Eye Equipment Co.
English China Clays Sales Corp. 622

EPIC, Inc.
Fisher Governor Co. 573
Fitchburg Screen Plate Co., Inc.
Fritz Publications, Inc. 640

General Chemical Division, Allied Chemical Corp. 610
General Dyestuff Company
Georgia Kaolin Company 600
Gulf States Paper Corporation

Hanchett Manufacturing Co. 627
Hart-Moisture-Meters
Hills-McCanna Company
Horton Manufacturing Co., Inc. 616
Hubinger Company, The
Humphrey Elevator Company
Huyck Felt Co.

Illinois Gear & Machine Company
Improved Machinery, Inc. 624
Ingersoll-Rand

Jenkins Sons, Inc., M. W. 634
Johnson Corporation, The 641
Jones & Sons Company, E. D. 633

Kalamazoo Tank & Silo Co. 641
Kamyr Inc.

Ladish Co.
Langston Co., Samuel M.
Lawson Company, The
Layne & Bowler, Inc.
Lestoil, Inc. 642
Lindsay Wire Weaving Co., The
Link-Belt Company 617
Lockport Felt Company
Lodding Engineering Corp. 628

Magline Inc.
Marathon Southern Corporation 574
Maxson Automatic Machinery Co.
Moisture Register Co.

Murray Mfg. Co., D. J.
Nash Engineering Co., The 619
National Aluminate Corp.
National Safety Council 640
Naylor Pipe Company
Northwest Engineering Company 632
Norton Company 636

Paper Industry, The 640
Parsons & Whittemore/Lyddon Organization
Patton Manufacturing Co., Inc., The 1st Cover
Penick & Ford, Ltd., Inc. 635
Perkins & Son, Inc., B. F.
Phillips Company, Inc.
Photovolt Corporation 641
Poirier Control Company 4th Cover
Powell Valves 580
Power Stainless Products Co.
Pusey & Jones Corp., The 613, 614

Charles P. Raymond Service, Inc.
Rogers & Co., Samuel C.

St. Regis Paper Company
Sandy Hill Iron & Brass Works, The
Scapa Dryers, Inc.
Shuler & Benninghofen 609
Smidth & Co., F. L.
Standard Oil Co. (Indiana)
Stickle Steam Specialties Co.

Taylor-Wharton Co.
Tennessee Corporation
Texas Gulf Sulphur Co.
Titanium Pigment Corp.

United Engineering & Foundry Company

Valley Iron Works Company
Vanderbilt Co., R. T.

Washington Steel Corp.
Waterbury Felt Company
Weyerhaeuser Timber Co. 608
Williams-Gray Company
Wolferz Alloy Equipment, E. C. 576
Yarnall-Waring Company 626

Professional & Business Service Section
Sirrine Company, J. E. 640

tor of an automatic retractable register reel for winding paper in such a way that following a single cut paper can be removed from the reel in sheets of uniform size.

Rupert B. Daniels

Rupert B. Daniels, 70, treasurer and superintendent of L. L. Brown Paper Co. at Adams, Mass., died in November following a brief illness.

He joined the Brown staff in 1910 and had held the position of superintendent for most of his long career. Daniels was named superintendent in 1938.

W. H. Anders

William H. Anders, 81, retired president of the Nashua Div. of St. Regis Paper Co. in East Pepperell, Mass., died in November at his New Hampshire home.

Anders was also a director of Perkins-Goodwin Co., the New York, N. Y. pulp and paper marketing and management firm.

T. R. Remsen

Thomas Richard Remsen, 79, retired civil engineer and paper mill superintendent, died recently at his Hudson Falls, N. Y. home.

A graduate of Dartmouth College and the Thayer School of Engineering, Remsen was at one time associated with George F. Hardy & Co., New York, N. Y. engineering firm noted for its work in the construction of power plants and paper mills.

Remsen was superintendent for Union Bag & Paper Corp. (now Union Bag-Camp Corp.) in the 1920s and during World War II was vice president and superintendent for Iroquois Paper Co. Inc.

E. K. Ludington

Elliott K. Ludington, 81, board chairman of Chase Bag Co., died recently in a New York, N. Y. hospital.

A native of St. Louis, Ludington had been associated with the packaging industry since 1896. He made his home in Connecticut.

Dr. E. A. Rees

Dr. Edwin A. Rees, an authority on papermakers felts and associated with Huyck Felt Co. for more than 30 years, died recently at the age of 67.

A native of Colorado, Dr. Rees received his doctorate in chemistry from the University of Illinois. Following service with American Smelting & Refining and E. I. duPont, he joined the Huyck staff in 1920.

While at Huyck, Dr. Rees established the first research and development laboratory devoted exclusively to papermakers felts. He served as director of felt development and felt sales and in 1937 became a director of the firm. Dr. Rees retired several years ago.

Robert Wallace Nelson, 48, vice president of American Air Filter Co. Inc., died unexpectedly in October. He was a former president of the Air Moving & Conditioning Association. Nelson joined the staff of Herman Nelson Corp. in 1939 and was a vice president when it merged with American Air Filter in 1950. With AAF, he was executive assistant to the director of sales until 1956, at which time he became director of the central administrative staff.

Paul M. Pope, 62, retired executive vice president of A. Kimball Co., New York, N. Y. paper converters, died late in October at his Connecticut home. He was formerly vice president of A. Kimball Ltd. of Toronto, Ont., and London, England, and was at one time president of National Tag Co. of Dayton, Ohio.

PAPER INDUSTRY

Whither?

... in production, processes, new products, markets

Chemically-modified cotton linters in rag-content paper

According to a report from the United States Department of Agriculture, cotton linters modified by a process of hydroxyethylation can be readily fibrillated in the beater, so that the fibers will bond together more tightly and give improved strength to paper.

Hydroxyethylation involves treatment of the linters with sodium hydroxide, centrifuging to damp-dry, and reacting the linters in a nitrogen atmosphere with a solution of carbon tetrachloride containing 3.8 per cent ethylene oxide.

Chemical treatment of cotton linters is also the basis for the Lintabond grade of fine papers recently developed by Buckeye Cellulose Corp.

Screens used in dewatering NSSC pulp

A battery of six Link-Belt vibrating screens is used by Union Bag-Camp Paper Corp. to reduce the moisture content of unwashed, unrefined NSSC pulp from 94 to 75 per cent. The drainage — resulting in uniform dewatering of pulp — is accomplished in 2 ft. of travel over 40-mesh screens.

Westvaco's flakeboard

West Virginia Pulp & Paper Co. flakeboard is a new high-quality core material made of thinly-cut aspen flakes and resins in a multiplaten process. Since the flakes are laid criss-cross and flat, the board has no grain or hidden weaknesses. In addition to being available as a coreboard, it is also produced in paper overlays and in birch and hardwood veneers.

Roll-coated and trailing-blade-coated paper in one operation

When Crown Zellerbach Corp.'s St. Francisville, La. mill will go on stream next year, it will feature a revolutionary method for the manufacture of coated printing papers. For the first time in history will coated paper be manufactured by both roll and trailing-blade coating in one continuous operation on the paper machine. It is expected that this double coating will produce a paper of extraordinary smoothness and high printability.

Glassed-steel reactors for chlorine dioxide plants

Packaged glassed-steel chlorine dioxide generator equipment is now available in capacities of 0.75 — 8 tons per day. The glass-steel reactors have been developed by West Virginia Pulp & Paper Co. and Pfaudler engineers in adapting the design of Olin-Mathieson type ClO_2 process.

In these reactors, the glass is fused to the steel by firings at 1700° F — thus forming an unusually strong bond between the glass and the base metal and providing a completely corrosion-resistant surface.

Keep them on the

PROFIT SIDE

of the wire . . .

A significant increase in percentage of filler retained—that's the **DOLLAR-SAVING** experience of more and more mills as a direct result of using a DARLING glue solution as a wet end additive.

We'd like to work with you in determining what can be accomplished in your mill. The entire cost is on us, so you've nothing to lose—everything to gain. You can make arrangements through your DARLING sales representative. Or write or call us direct.

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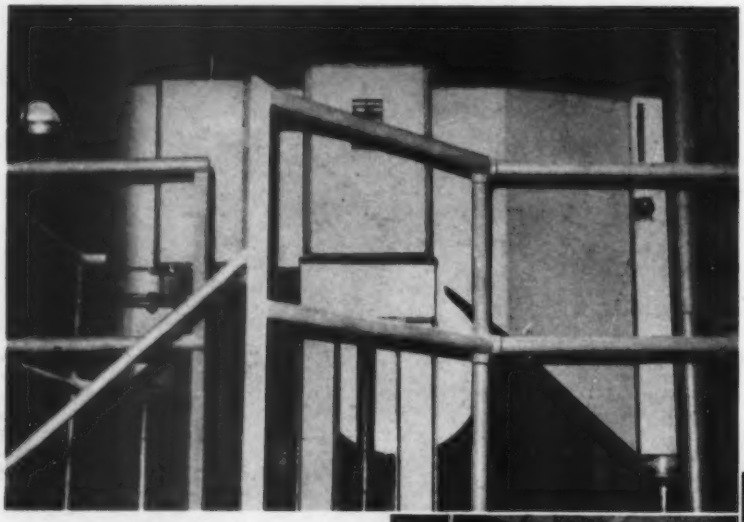
WANT COMPLETE STOCK REGULATION?

POIRIER COUNTERFLOW CONSISTENCY & BASIS WEIGHT REGULATOR

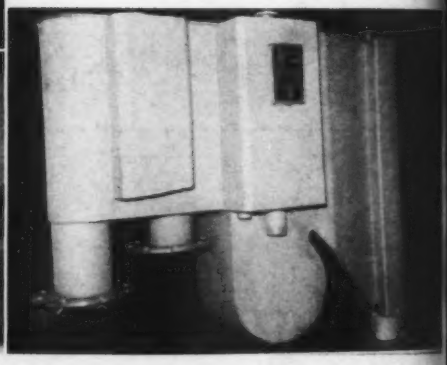


it regulates VOLUME of stock discharged to maintain BASIS WEIGHT TO WITHIN ?% plus or minus even when stock becomes too light to be controlled by dilution.

THIS MEANS! Incoming consistency can fall below control setting yet the regulator will automatically put on stock to maintain basis weight.

More yardage per run because light chest can be worked off practically down to the last drop.

Volumetric correction means getting on weight fast and holding basis in the face of consistency variation.
After shut-downs no adjustment required even where chest consistency has varied. The regulator automatically discharges the correct net amount of fiber at the new consistency.



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